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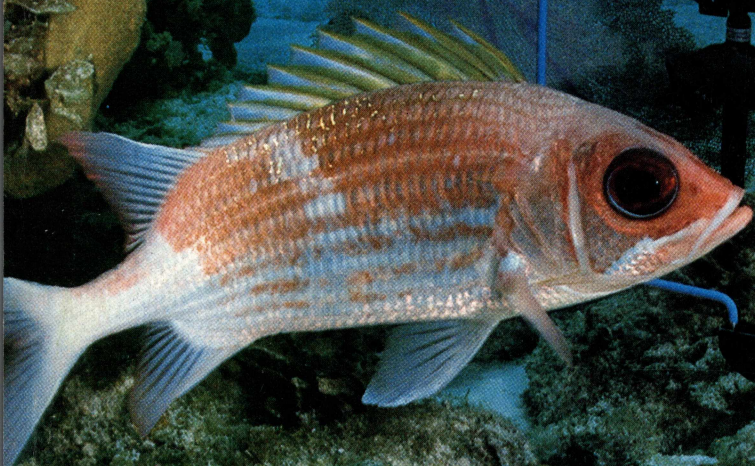
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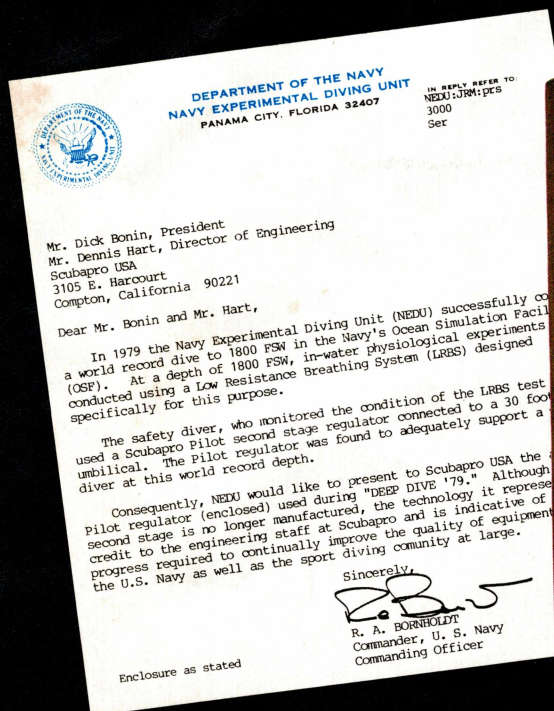
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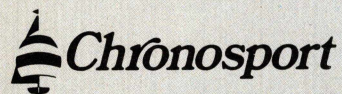
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Volume Thirty-One Number Ten

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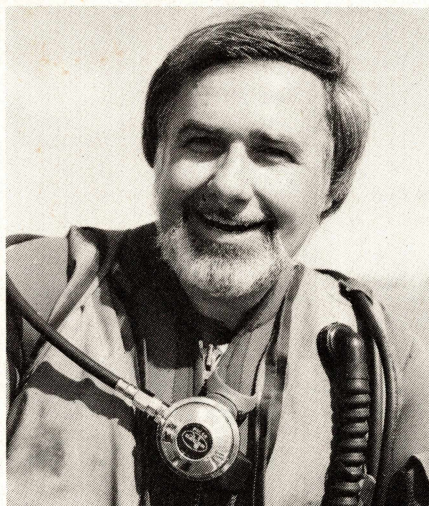
COVER

Underwater photographer, Danny Batchelder, lines up on an inquisitive squirrelfish in hopes of shooting a prizewinning photo. See page 24 for the winners of the USA photo competition. Photo/Geri Murphy.

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SDM Editorial

BY THE PUBLISHER



PAINTING YOUR TANK CAN BE HAZARDOUS

Ever since the first scuba tanks were produced more than 30 years ago, divers have been trying to paint them. The abrasive combination of sun, sand, sea and rocking boats has a devastating way of ruining even the most durable finish. Within months, most tanks show evidence of hard wear. Scratches, gouges, pits and blisters produce an unsightly appearance and many tank owners seek a method of refinishing their tanks. In many of the tropical resort areas, tanks are usually repainted twice a year to prevent rusting or other damage to the exterior.

I would guess divers have tried just about every possible paint preparation known to man. Their refinishing attempts span the entire spectrum of hard enamels, fancy lacquer coatings, epoxy paints, vinyl dips and more. Until recently, this preoccupation with tank painting had not been much of a problem. Unfortunately, new technologies in one industry can sometimes create serious problems for another. This happened last year to the world of diving.

In late spring, 1981, two Florida divers felt the need to repaint three aluminum scuba tanks. They took their tanks to a powder paint company which specialized in a new process for achieving an extremely durable paint coating.

First, the tanks were sandblasted to remove all traces of the original factory paint job. Next, the tanks were painted by a special process using a metallic powdered paint. Finally, the three tanks were placed into an oven and cured at a high temperature. The divers were not familiar with the bake-on procedure, and the

paint company knew nothing about scuba tanks and the tremendous pressures involved. The paint company had never treated any scuba tanks before.

Sometime after the refinishing was completed, one of the two Florida divers took his newly painted tank to a dive shop for filling. It exploded before reaching the designated working pressure and injured five people who happened to be in the dive store at the time. The employee filling the tank suffered a broken arm and other injuries, but luckily survived the experience. The blast ripped through the sidewall of the dive store and shattered the front window. The store's interior was a shambles.

Four days later, the other Florida diver took his two tanks into another dive shop for tank inspection and filling. The first of these two tanks also exploded while being filled. The dive store owner lost both his legs in the accident. Needless to say, this dive store was also demolished.

These two tragic scuba tank accidents in less than one week caused shock waves throughout the dive industry. Dive equipment manufacturers and distributors suddenly focused their attention on an entirely new hazard which never before existed. This was the first time that scuba tanks had exploded as a result of a paint job!

What exactly happened in the case of these two explosions? Very simply, the paint curing process used for the refinishing had reduced the tensile strength of the scuba tanks involved. When this aluminum alloy is heated to temperatures in excess of 400°F, the metallurgical struc-

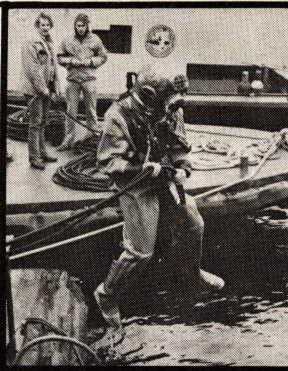
ture is altered. While these heat-damaged scuba tanks may have appeared perfect they were no longer the same sturdy pressure vessels they were prior to the painting process.

As a result of investigations and studies of the damaged tanks involved, both the Dacor Corporation and U.S. Divers Company issued warning bulletins to dive stores, dive resort operators and all scuba instructor associations. These companies warned divers not to use paint or refinishing processes which involve high temperatures for curing or baking. They also recommended that compressor operators be careful of freshly painted tanks, and verify that a hydrostatic test was completed after the new paint job. The warnings apply to *all* dive cylinders.

Luxfer USA, Limited is now putting warning labels on all scuba cylinders advising discontinued use of any aluminum scuba tank which has been subjected to any sort of action by fire. If there is any question about the degree of heat or damage involved, a hydrostatic test should be conducted prior to filling.

If you have a scuba tank which you suspect has been subjected to any painting process that involves a high temperature, have it hydrostatically tested before filling or further use. If you are planning to have your scuba tank repainted, be sure that no heat is applied to the tank. If you are in doubt about the paint process you intend to use, discuss the matter with your local dive shop owner or contact the manufacturer. Tampering with a scuba tank, and its finish, can be a shattering experience for the tank and its owner.

MAN IN THE SEA



ARE YOU READY FOR THE CHALLENGE?

"Our destiny is linked to the fate of the oceans, and, ironically, we will determine the future of the sea through our actions in the next few decades," declares Dr. Sylvia Earle, who on September 19, 1979, walked on the sea floor, 1,250 feet below, for two and one-half hours. Dr. Earle's statement supports the continuing need for qualified commercial divers. Your entry into the world of deep sea diving will be a most prestigious and rewarding career. *Well-trained divers are in demand not only in the oil industry, but also in underwater salvage, construction, farming and environmental awareness.* Your first step to employment as a commercial diver is superior training.

Divers Institute of Technology (DIT) was founded by men who have successfully met the challenges of innerspace. These men know from experience what it takes to get the job done. Retired Navy and professional deep sea divers joined forces over 14 years ago to establish a commercial diving school that would train and graduate only qualified entrants to the industry. *The success of the DIT program can be measured by the continual expansion and improvements to our physical location and facilities, by our accreditations, credentials and unequalled curriculum and by the over 1400 graduate divers we have supplied to major commercial diving firms throughout the world.*

Divers Institute of Technology developed a six-month course that set an industry standard. Training is based on a highly sophisticated deep sea diving program that prepares you both mentally and physically to enter this new environment. DIT's curriculum has been designed to prepare you for gainful employment in all

fields of commercial diving, not only in the oil industry. Some of the fields DIT graduates are currently working in include salvage and repair, inspection, aquaculture, scientific data research and the offshore oil industry. Classroom instruction deals in facts and theory. Open water instruction gives you the practical application of classroom techniques. *The culmination of your training is actual dives to depths of 200 feet. To our knowledge, we are the only commercial diving school that puts you to this test. The confidence gained from this experience is unequalled.* Before you decide which school to attend, check this point out. Many schools provide only simulated deep dives in recompression chambers and diving tanks on dry land.

After proper training and graduation, you are prepared to enter the commercial diving field. It is then that you realize just how much responsibility comes with the territory. Responsibility to perform the tasks you were trained to do! Responsibility to your diving team and responsibility to all support personnel. *DIT will not graduate a student unless confident he possesses the ability to become a top rate commercial diver.* Divers Institute of Technology training facilities are practical. *Our site of instruc-*

tion is located on the Lake Washington ship canal where water is murky and the visibility is poor; the type of environment you will be exposed to in the field. The equipment used in training is also what you will find in the field. Of the nearly 6 billion acres of continental shelf in the world, 78% has yet to be explored. Investigate DIT now . . . judge for yourself who's best qualified to train you right!

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
BY FRED BOVE, M.D., Ph.D.

By now, like most physicians, I'm used to the phone ringing late at night, but the Sunday night calls are always the most interesting and predictable.

"I went diving on Saturday, the weather was good, so we dove an extra tank. After three dives with a lunch break between the second and third dives, we packed up and headed for shore. About an hour after I finished diving, my right toes began to tingle. Nothing else happened so I just forgot about it. When I got home, three hours later, I still had the tingling in my foot, but it had spread a bit—up to my thigh. That dive must have been tougher than I thought; I was so tired, I went to bed early that night—about 6:00 pm—and skipped supper. When I woke up on Sunday I wasn't as tired, but the tingling was still there, in fact, the left foot felt the same way—up to the hip. About 3:00 pm this afternoon, I began getting cramps in my lower belly, they are worse now, and I don't remember urinating since last night. The reason I called is because I have to go to work in the morning and I can't move my right leg. Do you think these problems could be related to the dive? I think our depth was 90 feet, and we were careful to come up as soon as our pressure gauge read 300 pounds."

This story is common enough that I wonder if it isn't written in a book somewhere. The diver who called went through a textbook description of untreated decompression sickness (DCS). The proper treatment is recompression, and the success rate goes down the longer one waits before getting help. All divers should be familiar with decompression sickness and should be ready to admit that they need help when symptoms appear. DCS in sport diving frequently causes injury to the spinal cord. Damage to the spinal cord occurs when bubbles form in the tissues after an inadequate decompression. These bubbles grow, expand, distort the tissues and

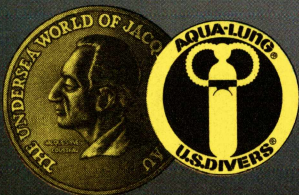
block blood flow, causing a loss of function in regions of the spinal cord which provide control to the leg muscles and the bladder and which provide the ability to feel sensations in the legs. Often, the first symptom of spinal cord DCS is a loss of normal feeling in one or both legs. The numbness can begin in the toes or foot and may go up the leg to involve the groin area. Commonly, one or both legs become weak because of injury to nerves needed for muscle control. As the process continues, the bladder may become paralyzed and the injured diver then becomes unable to urinate. All this begins with a little tingle in the toes, and by waiting long enough without treatment, our diver with DCS allowed the process to develop to the point of paralysis.

There are several important facts about DCS that all divers must know. The first is that DCS usually occurs sometime after you have left the water and it is possible to develop symptoms as long as 24 hours after your dive. Most cases of DCS occur within three to four hours of the dive, but symptoms can occur later. When you are concerned about possible DCS, don't use time as an excuse for not seeking help. You should know the list of DCS symptoms. The variety of problems is wide enough that it often becomes difficult to separate DCS from other illnesses. I've seen DCS diagnosed when arm, leg, or back injuries, hearing difficulty, seasickness, viral infections, or anxiety were the correct diagnoses. I've also seen DCS diagnosed as a stroke, heart attack, pneumonia, arm and leg injury, arthritis, cold, overwork and a variety of other things. Another point to keep in mind is that as divers, we seem to have a sense of invincibility which produces a tendency to deny having DCS. Consequently, divers often wait too long before seeking advice and risk permanent spinal cord damage. Physicians often get calls for advice and must mobilize the hyperbaric chamber treatment team in the middle of the night. If you are concerned about DCS, a phone call for advice is better made early; otherwise, there is a significant risk of developing a permanent injury. The most important point to remember is that any medical problem which occurs within 24 hours of diving should raise concern about DCS, and the advice of a physician familiar with diving medicine should be consulted. Since most physicians are not taught about diving medicine in medical school, internship, or residency, you should find a doctor who knows diving medicine before you dive, so if problems arise, you can seek the proper advice. You can always call the Diving Accident Network at (919) 684-8111 for advice (we'll have more about DAN in a later column) or the Undersea Medical Society in Bethesda, Maryland, (301) 530-9225 for the name of a nearby physician-member who is familiar with dive physiology. 

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HIGH PRESSURE NERVOUS SYNDROME

A temporary affliction with symptoms similar to Parkinson's disease could be one of the reasons deep water divers sound so garbled underwater.

"For a long time, everyone thought divers were unintelligible only because of the levels of helium and oxygen they were exposed to in deep diving," said Dr. Harry Hollien, a scientist and founding director of the University of Florida's Institute for Advanced Study of the Communication Processes.


"Now, we think high pressure nervous syndrome, a condition that's been documented since 1970, contributes to it in a major way. Like Parkinson's disease, the syndrome brings on tremors, rigid muscles, a loss of movement control as well as garbled speech," Hollien said.

Hollien and Dr. James Hicks, both veteran divers, have studied three divers at depths of 350 to 1650 feet at the Norwegian Underwater Institute in Bergen, Norway. They are the first to link speech unintelligibility to the syndrome. The syndrome affects divers to different degrees and at different depths and sometimes even varies in individual divers.

"Divers working on oil rigs, on military work, mining and on scientific research

have died because people on their ships couldn't understand what they were saying in emergency situations," Hicks said.

Hollien and Hicks plan to do more studies, funded by the Norwegian Institute, UF and by the Dreyfus Foundation of New York City, which financed their first studies. Hollien said when and if they are absolutely positive the nervous syndrome is causing the unintelligibility, they will consult with UF speech pathologists to help them tell divers how to overcome the problem.

"Speech pathologists could help us work out behavior therapies to help divers, much like they would for people who have Parkinson's disease or cerebral palsy," he said. 

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Oceaneering International designed Commercial Diving Center's training programs, moving over 40% of the graduates into key jobs under world-wide diving contracts. The others may opt to work for some 200 diving contractors who look upon C.D.C. as a producer of high-quality trainees ready to take on any job with any type of equipment.

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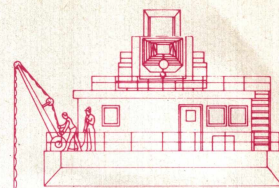
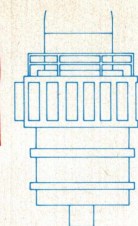
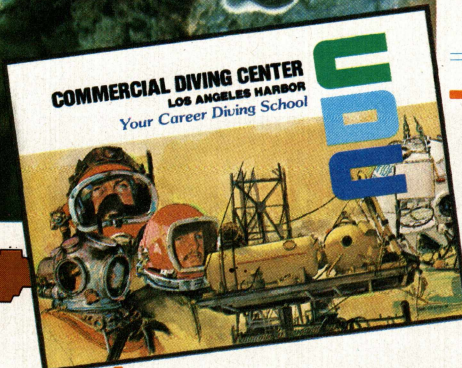
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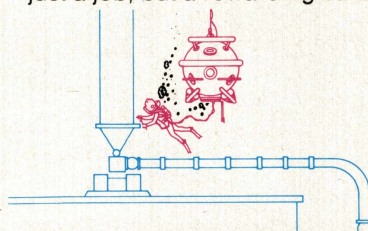
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Diver's Calendar

October 3-18 Fall Diving Course for Physicians on Palau, Truk and Guam. Sponsored by the International Society of Aquatic Medicine (ISAM). (Contact: Michael Rosco, M.D., 1127 Wilshire Blvd., Los Angeles, CA 90017)

October 8-10 Northwest Divers Festival at Highline Community College, Seattle, WA. Lectures, exhibits, demonstrations, rescue workshop, CPR course and Scubalympics. (Contact: Rick Kaiser, 3916 Dayton Ave. N., Seattle, WA 98103; (206) 633-3343)

October 9 Sonoma County Diver Rescue Workshop at Santa Rosa Junior College. Diver awareness, safety, and emergency procedures. Pool and ocean training. (Contact: Virginia Bria, P.O. Box 3967, Santa Rosa, CA 95492)

October 9 National Association for Cave Diving Fall Quarterly Mini-Semester and BOD Meeting in Orlando, FL. (Contact: NACD, P.O. Box 14492, Gainesville, Florida 32604)

October 10 Second Annual Underwater Pumpkin Carving Contest, Horseshoe Lakes in St. Bernice, Indiana. Open to all certified divers. (Contact: Indiana Skin Diving Council, c/o Greg Brock, President, 927 Walnut St., Clinton, IN 47842; (317) 832-7420 or Aqua-Nut Divers, c/o Joe Chambers, President, RR #1-Box 360, Clinton, IN 47842; (317) 832-9930)

October 14 The History of Diving Equipment, presented by Nick Icorn for the Santa Ana Dive Club. (Contact: Jim Taylor, 22011-J Rimhurst Dr., El Toro, CA; (714) 586-9274)

October 15-16 Sixth Annual Underwater Film Symposium sponsored by the Rockford Divers Association and featuring Jack McKenney. Holiday Inn, South Beloit, IL. (Contact: Bill Steinborn, 1385 Randall Drive, Rockford, IL 61108; (815) 332-4225)

October 30 Dive to Adventure with Jack McKenney, at Caltech's Beckman Auditorium, Pasadena, CA. Films and slides. Tickets \$6. (Contact: Mutual and Ticketron agencies or the Caltech Ticket Office, 332 S. Michigan Ave., Pasadena, CA or call (213) 356-4652)

November 5-7 International Conference on Underwater Education (IQ-13) at the Red Lion Inn, Ontario, California. (Contact: Sue or Ron Bangasser, 12724 Valley View Lane, Redlands, CA 92373; (714) 794-4495)

November 6 Sixth Annual Dive New Jersey Symposium. Sponsored by the New Jersey Council of Diving Clubs and hosted by the Rutgers University Scuba Club. (Contact: John Brauner, 89 Winston Dr., Somerset, NJ 08873; (201) 249-4651)

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NAVY DIVER

BY MICHAEL J. GANAS

"This is a hell of a way to die with my wife ready to have a baby any time now," Bob Bunyan spoke calmly, grimacing with pain within the confines of his Mark V deep sea helmet. As he communicated with the topside crew, he knew everything possible was being done to extricate him from his near-death situation.

It was 1957. Bob and another Navy diver had been tunneling under the stern section of a sunken Army ship, trying to run some hoisting chains under the vessel's hull 15 feet below the mudline. It was a routine Naval salvage operation.

The two divers had just completed the task of shackling the chains together and had begun to follow the steel links back toward the surface when a topside pump suddenly malfunctioned and the jetting nozzle Bob was holding ceased delivering pressurized water. Almost immediately, the mud tunnel collapsed on he and

his partner, causing the ship to resettle and trapping them underneath.

Bob could feel his ribs breaking one by one as the immense hull began to slowly press against his chest. To make matters worse, the communications gooseneck on his helmet, pressing ever harder against his buddy's hardhat lodged beneath him, suddenly broke under the stress and his remaining link with human voices abruptly ended. The cracked fitting on his Mark V allowed seawater to leak into his helmet, flooding it halfway. At a depth of 135 feet, cut off from the world above, and in total darkness, he was slowly being crushed to death. But the life-sustaining air kept flowing.

Nearly eight hours elapsed before Chief Bunyan was rescued and placed in a recompression chamber. Suffering four broken ribs in the front and four in the back, his injuries were miraculously minor in comparison to the ordeal he had been through.

Bob's helmet had not been easy to remove as the breastplate it attached to had been bent like a pretzel. A crowbar had been needed to dislocate his head-gear.

I listened intently as Bob Bunyan related this, one of many stories transcending his 22 year tour of duty with the Navy. I had known Bob for three months before I ever learned of his extensive dive career. My line of work had brought me in

contact with a broad spectrum of professional divers, but none with as extraordinary a background as Bob possessed. Resolving to learn all I could about the man, a nostalgic hint of the old Sea Hunt series came to mind, making me believe that if ever a man lived who was equal to the fictional Mike Nelson, Bob Bunyan came reasonably close.

During his exciting and rewarding career, Bob's ability and knowledge of the undersea world had led him to many thrilling and dangerous jobs. Some of his more hazardous assignments were disarming WW II mines, deep submarine lockouts and commando infiltration activities. Many of the dives he made over the years have been rated by the Navy to be on the "extraordinarily hazardous" level and are documented by naval dive logs Bob kindly consented to let me review.

Entering the service in the early 1940's, Bob graduated from the Army Diving School in 1944. Jumping over to the Navy a year later, he knew that the UDT was the place for him. His dive career escalated rapidly, taking him through every school the Navy had to offer, including diving salvage, deep sea diving, mixed gas, and underwater demolition. Later in his tour he became one of the first Navy SEAL's.

Following World War II, Bob spent a considerable amount of time in the Philippines on harbor clearing assignments.



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NOVEMBER 5, 6, 7 1982

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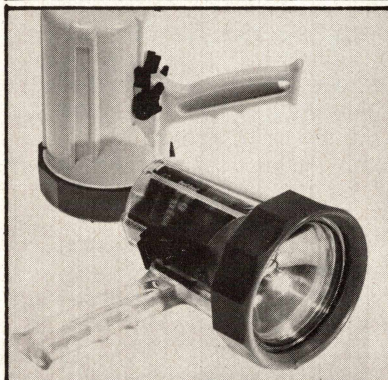
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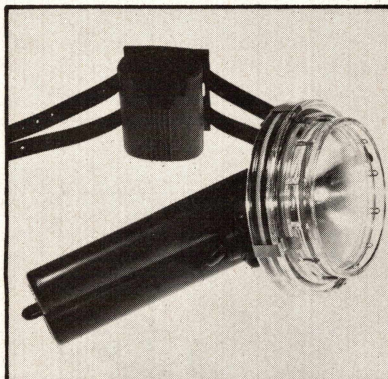
MINI C-LITE I

The Mini C-Lite I, 5" long x 3" diameter is designed to operate with 4 "C" cell alkaline batteries (not included) and a standard flashlight bulb. This combination provides 4 to 6 hours of light with twice the intensity and coverage of similar size lights. A rotating ON/OFF switch offers easy one hand operation. The light's size and the optional (#1056) rubber holster offer unlimited mounting applications. Lite is available in black, clear or orange.



IKELITE II

The total concept of this Lite is simplicity in design, for trouble free performance and long life. The IKELITE II features a unique ON/OFF switch and lock. The lite operates from a standard 6 volt battery (not included) and a #4546 sealed beam bulb. Unquestionably the brightest and most dependable diving light in its price range. Lite is available in black, white or clear.



C-LITE I

This Lite offers 50% greater intensity than lantern battery powered lights. The special sealed beam bulb requires six "C" cell alkaline batteries and produces 10,000 initial candle power as compared to the 6,000 candle power of our IKELITE II (non-rechargeable) and other lantern battery powered lights. The compact size and unique shape offer easy one hand operation. This Lite can easily be carried on all dives in the Optional (#1055) C-Lite Holster.



MODULAR I LITE

This Lite utilizes six inexpensive "D" cell flashlight batteries (not supplied), to provide intensity unequalled by any popular priced diving light. Lite can be converted to Modular X, SuperLite, or MovieLite. Available in black or clear.

MODULAR X LITE

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C-LITE II

One of the brightest rechargeable Lites in the diving industry. The clear push on cap allows easy opening and sealing, and the o-ring can be seen at a glance. This Lite comes complete with ni-cad batteries, charger and has a safe working depth of 800 feet. The special ni-cad batteries provide a constant intensity for approx. 1½ hours between charges. The compact size and shape offer easy one hand operation. This Lite can easily be carried on all dives in the Optional (#1055) C-LITE Holster.

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NAVY DIVER

One harrowing but somewhat comical experience occurred in 90 feet of water on a sunken wreck that Bob's team was trying to remove from the area. While moving along a dark corridor aboard the dismal wreckage, something kept bumping lightly into the rear of his Mark V helmet every time he stopped. Each time he turned to see what it was, there was nothing there. After he was bumped a fifth time, he spun quickly and found himself staring into the face of a human skeleton, a horrible, frightful sight in the darkness. "It made my hair stand on end," he said. He surmised that his exhausted air had become trapped in the shredded, rotten garments of the corpse, making it neutrally buoyant. His passage through the water had drawn it with him.

During the historical Mercury and Apollo projects, Bob helped train the astronauts in underwater environments simulating the zero-gravity characteristic of space flight. Shephard, Carpenter, Cooper, and White were among those astronauts. Bob was also involved in the recovery of space capsules at sea. One of his favorite stories concerns a \$20 bill the astronauts and scientists sent up in one of the capsules. Once the capsule re-

turned to earth, the greenback was photographed by all the astronauts and presented to him as a gift during a welcoming home party. That night he remembered "tying one on" with the space jockeys, but not much more. The following day, much to his dismay, he discovered he had inadvertently spent the coveted \$20 bill. It has never been found.

One incident Bob recalled occurred in the Portsmouth Naval Shipyard early in his career. The *USS Wisconsin*, tied up alongside the dock, required its sea chest to be cleaned. Bob and another diver donned shallow water gear—surface-supplied Desco full facemasks—and went under the hull to carry out the work. Engrossed in scraping marine growth out of the chest, they didn't notice the 45,000 ton ship settling into the muddy bottom as the tide went out. Too late to escape from the confined space of the chest, they were forced to spend a gloomy 15 hours in the cold, cramped area until the tide rose high enough to lift the hull clear of the bottom.

Another incident nearly terminated Bob's career as well as his life. While disarming an old WW II mine at 150 feet, a relatively green diver who was assisting him failed to follow the correct sequence and accidentally triggered the fuse. Although the blasting cap ignited, the 750 pounds of explosive miraculously did not, "a one chance in ten million possibility," as Bob put it. The cap did, however, pro-

duce enough concussive force to leave both men stone deaf for a period of two weeks.

One assignment had Bob recovering an unexploded torpedo. Using scuba gear, he was straddling the weapon and had just completed installing the nose cage. The movement somehow activated the propellers on the subaqueous missile and without warning it shot forward. Fearful of letting go and being seriously injured by the razor sharp propeller blades, Bob hung on. But an instant after the torpedo had begun its rapid acceleration, the thrusting of the blades ceased. The ride, lasting no more than a second, tore off Bob's facemask.

Perhaps the biggest prank anyone ever pulled on the Navy occurred off Puerto Rico in 1966. Drinking in one of the local pubs, Bob and another diver, both Navy SEAL's at that time, listened while crew members of the *USS Skate* boasted about the tight security maintained aboard their nuclear submarine. The crewmen went on to explain how anyone attempting to get near the anchored vessel at night would be shot, there being a sentry posted on the bridge, stern and bow.

Prideful of belonging to the most elite unit in the Navy, Bob and his companion swam out to the sub later that night and managed to paint the portion of the rudder above the waterline a haze-gray color. The rudder was originally black. Al-

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The Marine 32 is dedicated to the Nikonos III and electronically dedicated to the Nikonos IVA. It can also be used with the Nikonos I and II with an optional adapter plug. Multiple flash is simplified with the unit's built-in auto-slash. In addition, the flip of a switch provides many lighting ratios at full or one-half power for various

creative techniques, particularly close-up photography. And six AA Alkaline or Nicad batteries will generate up to 150 flashes with recycle times as fast as 3 seconds.

What's more, the #24 filter diffuser widens the underwater beam angle to that of a 28mm lens while its optional #16 filter widens it to a 20mm. And with its GN of 106 (53 underwater) at ASA 100 in feet, one Marine 32 is all you need for most lighting situations.

So don't let the good ones get away. Don't go without a Sunpak Marine 32.

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though powerful floodlamps on the bridge had bathed the vessel in bright light, a shadow was cast by the leading edge of the rudder masking both men in darkness. The stern sentry, less than 50 feet away and armed with an M-14 rifle, never heard them. When the painted rudder was discovered the following day, there was a furor heard clear back to the Pentagon.

When asked about his most interesting mission, Bunyan related an episode about a Super Constellation that went down in the North Atlantic in 1958 off the coast of Newfoundland, killing all aboard. Having been scrambled to the site, his mission was to locate the aircraft and destroy all the plane's electronic gear he was not able to remove. If he was successful, his next priorities were to recover the bodies and over \$1 million in American currency.

Because the wetsuit was still in the developmental stages at that time and not being used by the Navy, Bob was forced to use the standard Navy garb for cold water diving whenever full dress deep sea gear was not available or was impractical—heavy woolen underwear covered with a layer of grease. Never in his life did he remember being so cold. But he and two other divers managed to locate the airplane on the first day. The light shallow water gear gave them plenty of mobility.

Whenever they would surface, the ship's doctor had a full glass of whiskey waiting for them to warm their innards. Although they stayed high during most of the mission and took hot baths at the end of each day, they could never fully stop shaking.

By the second day, the dive team had removed and destroyed all of the plane's sophisticated electronic gear. Moving around inside the wreckage was difficult as well as hazardous owing to the jagged metal and debris that tore into the divers' clothing. The thin-skinned Pirelli drysuit that the Navy occasionally used would have been useless.

A storm soon arrived, compounding the difficulties, and a heavy sea began to rock the aircraft, which was perched precariously, 90 feet down on a narrow ledge along an undersea mountain.

When a Mark V rig arrived on the third day of salvage, it was decided that it was too bulky to be used within the confines of the plane. The diver using the deep sea gear would tend the air hoses of the penetrating divers.

Upon descending, Bob quickly discovered that the main fuselage of the airplane had split partially in two, both halves alternately opening and closing with the surge like enormous jaws. Bunyan timed his entry into the cabin and set about retrieving bodies while the Mark V diver tended his hose.

When he was almost finished the aircraft suddenly turned 180 degrees and
(Continued on Page 96)

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Lake Michigan's Best Wrecks

The Most Accessible Shipwrecks
For Midwest Divers

Above: Great Lakes wreck diver Dan Johnson is shown with the first deadeyes and pulleys brought up from the *Kate Kelly*.
photo/Rockford Register Star



After thorough cleaning and polishing, the brass water injector from the *Flora M. Hill* makes a beautiful collector's item.
photo/Dan Johnson



Dan Johnson (lower left), Jeff Fustin (lower right), John Linder (upper left), and Bill Harast with items taken from *Kate Kelly*.
photo/Bill Steinborn

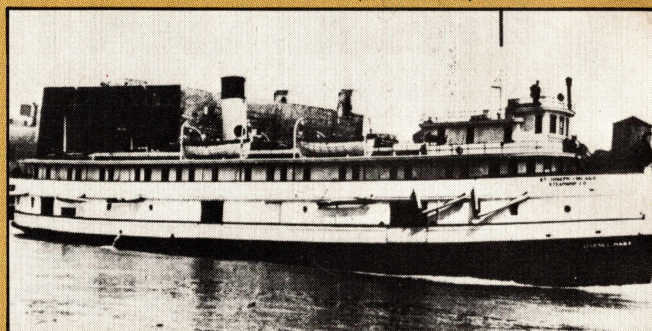
BY BILL STEINBORN AND DAN JOHNSON

Lake Michigan, long used as a shipping path for the commercial and passenger trade of Middle America, is a graveyard of sunken ships. From La Salles' *Griffon*, lost in 1679, to the giant *Carl D. Bradley*, lost in 1958, the lake has had a long and treacherous history.

Because of prevailing southwesterly winds, the western shore of Lake Michigan has been the chosen route of many an unwary ships' captain. But, when storms of unexpected intensity push waves as high as houses and ice as hard as cement against their hulls, even the sturdiest ship will succumb. Winds quickly changing to the northeast are a signal to those along the southwestern shore that there is danger on the lake.

The western shore of Lake Michigan has had heavy shipping traffic for almost 200 years. The passenger trade began in the early 1800's and was of major importance until about 1930. The depression and the following popularization of the automobile combined to eliminate it. The steel mills that still dot the area of East Chicago and Gary, Indiana began to contribute to the lake traffic in the late 1800's and account for most of the remaining ships at the south end of the lake. The movement of material to rebuild Chicago after the great fire in 1871, and the construction involved in the World's Fairs in 1893 and 1933, also contributed to the lake traffic. Ships providing these products and services, along with those carrying material and equipment to maintain Milwaukee and Chicago, the two largest cities on Lake Michigan, now comprise the majority of the wrecks available to divers in southwestern Lake Michigan.

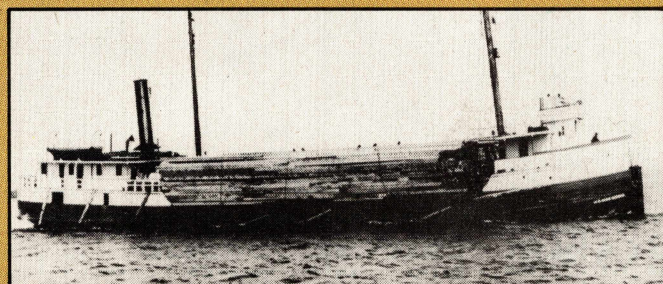
While hundreds of wrecks lie along the diveable shoreline between Michigan City, Indiana and Milwaukee, Wisconsin only a fraction of them have been located and visited by divers. Of



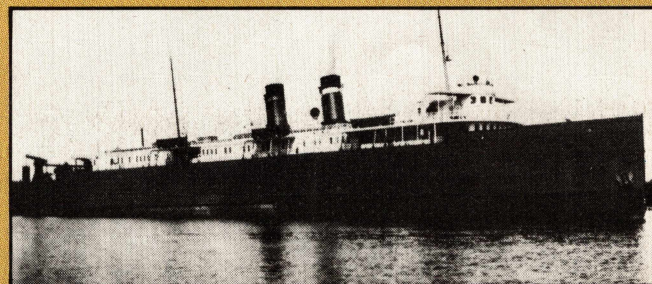
Steamer *Norland* (when she was the *Eugene C. Hart*).



The steel *Flora M. Hill* on the Chicago River.



J.D. Marshall while with the Hines Lumber fleet.



The car ferry *Milwaukee* was lost with all hands.

that small number, the following wrecks are representative in type of vessel, type of cargo, and date of loss. All these shipwrecks have one thing in common: They are still yielding nautical antiques to the diver willing to seek them out with the needed combination of patience and persistence!

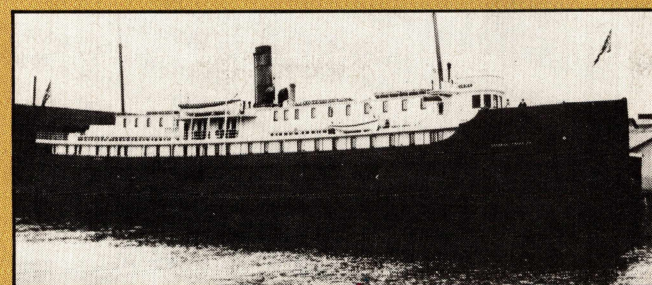
Every effort has been made to provide divers with the most accurate locations of the shipwrecks. When Loran C coordinates are not available, compass readings are given. In locations without multiple landmarks, visual sightings and dragging methods must be used.

In most cases, historically significant items have been removed from these wrecks. Many of these items have already been donated to marine museums. However, it is hoped that any diver finding an item of significant importance will, after enjoying it with family and friends, give it to a museum. When in doubt, contact the Wisconsin Historical Society, or the Milwaukee Public Library. It is through these organizations that the wrecks were researched, eventually located, and are now being enjoyed by divers.

The wooden steamer, *J. D. Marshall*, sprang a leak and capsized on June 10, 1911. She had been hauling sand from the Indiana shoreline to Lincoln Park in Chicago. She had just been loaded with 400 cubic yards of sand when she began to



Goodrich steamer, *Wisconsin*.



The *Iowa's* wooden hull was crushed by ice.

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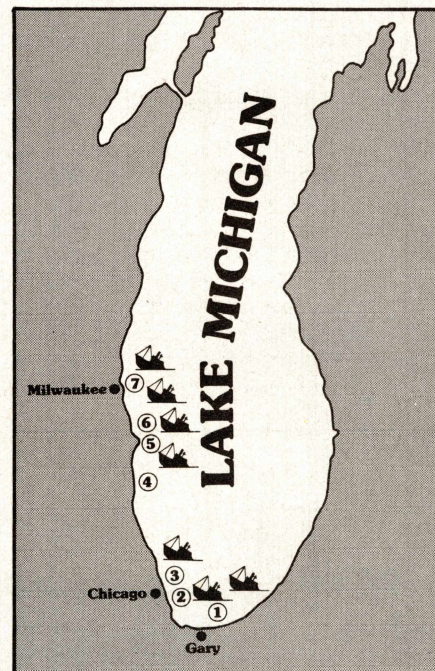
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LAKE MICHIGAN WRECKS

leak. Her captain turned her around and brought her in closer to shore and anchored to repair the leak. The ship's engineer later offered this statement:

"We were anchored for the night and had repaired the leak. We could see the picnic party around the bonfire on shore, and could hear their voices. However, she sprung another leak and when I wanted to start the pump, the fire was low and no steam. I climbed on deck and called for two men near me that she was



The above map shows the locations of the Lake Michigan wrecks: (1) *J.D. Marshall*, (2) *Iowa*, (3) *Flora M. Hill*, (4) *Wisconsin*, (5) *Kate Kelly*, (6) *Norland*, and (7) *Milwaukee*.

sinking! I grabbed a life preserver and jumped just as I heard a crash, and the boat turned over. I was pulled up by a couple of others who had climbed up on the overturned boat."

Captain Leroy Rand swam ashore, while five crewmen hung onto the hull waiting for help. Six lives were lost in the accident. The ship floated upside down for about a month, scattering tools and equipment all over the bottom. Finally, her boiler fell out and the hull sank, still upside down. The *J. D. Marshall* was 154 feet long and 33 feet wide. She was built in 1891 and used in the Hines Lumber fleet until the spring of 1911. The wreck was located by Gene Turner in 1979. It is 600 yards north of the water tower off the western boundary of the Indiana Dunes National Park, in 32 feet of water. Many tools can still be found in the sand around the wreck and her large propeller is a favorite spot for photographers on days when the visibility is good. The boiler rests beside the hull and a large pile of

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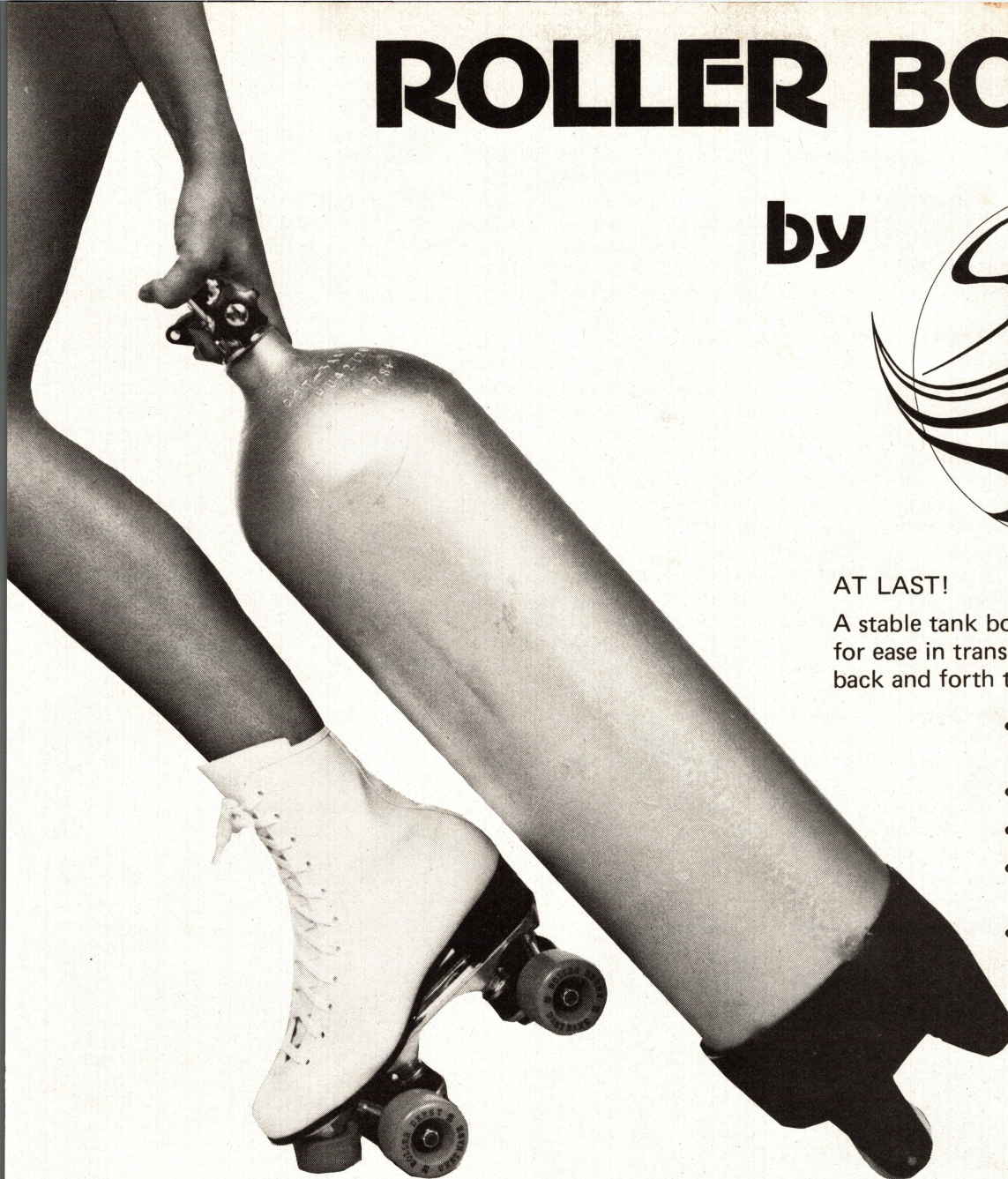
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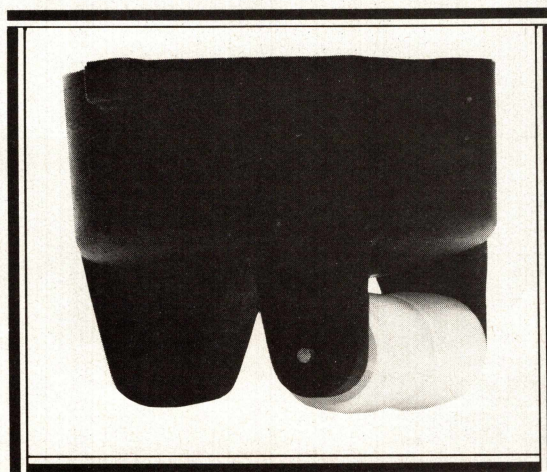
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anchor chain can be found off the stern.

The steamer *Iowa* was cut through by ice on February 4, 1915. She was on her normal run from Milwaukee to Chicago and had made stops at Racine and Kenosha, Wisconsin. Just east of the Chicago harbor the ship was surrounded by pack ice 14 inches thick. With the wind pushing the ice, the ship was quickly entrapped. Since she was a wooden vessel, she dared not push against the ice and shut down her boilers. Tugboats tried to reach her in vain, but the ice was too thick. When it began to cut through the hull, 71 people walked across the ice to safety. The ship was cut entirely in two, with the lower portion falling through the ice first. The upper part fell through on February 5. The ship was dynamited by the Corps of Engineers as a hazard to navigation. Her engine and boilers were removed during World War I. The ship was carrying a cargo of automobile parts, including magnetos, bumpers and crankshafts. The magnetos clean up to be fine souvenirs with brass nameplates. The bumpers are rusted, but some have brass name tags that make excellent money clips!

The *Iowa* was 202 feet long and 36 feet

wide. She was found by Tom Freeman of Chicago in 1976. She lies two miles from the Chicago light in 35 feet of water. Use these compass coordinates: 250° off the Chicago lighthouse; 340° off the Harrison water crib; 150° off the Four Mile water crib. The *Iowa* is scattered over a wide area, but dragging in a north-south direction should get the diver on her.

The steel steamer *Flora M. Hill* was also a victim of the Lake Michigan ice. She was crushed and sank on March 11, 1912. Built in Philadelphia in 1874, she was 130 feet long and 26 feet wide. The ship had left Kenosha the evening before with her heaviest cargo of the season, brass beds and automotive running lamps. The *Hill* became trapped in the ice about one-half mile from the Two Mile water crib outside the Chicago harbor. She spent the night fighting the ice (she had been fitted with heavy iron plates when brought to the Great Lakes), but in the early morning hours her stern began giving away to the pressure. When the pumps could no longer handle the water, Captain Rowland D. Hill ordered the crew to abandon ship. With the help of the cribmaster, the crew of 28 walked over the ice to the crib. They were later rescued by the tugboat *Indiana*. The ship was later dynamited by the Corps of Engineers as a hazard to navigation. Of interest to divers will be her cargo of automotive lamps. Although the brass beds were plated, the lamps are solid brass. Many

are now rare collectors items. Although damaged in the dynamiting, they can be straightened and repaired. Many are still to be found in the wreckage.

Sam Mareci found the wreck in 1976, in 37 feet of water. The bow points to the southwest, the stern toward the Two Mile crib, about one and one-half miles from the Chicago harbor (Loran C: 50077.0 and 33375.4). Her boiler, prop and rudder are still in place, surrounded by piles of iron plates that once were the hull.

The steamer *Wisconsin*, a veteran of 48 years of lake service, became a victim of a Lake Michigan gale on October 29, 1929. The ship was enroute from Chicago to Milwaukee, when it was caught in a fierce storm. She began to leak and called for assistance. Local fishing boats were able to reach her and aided in rescuing her four passengers and 55 of her crew. Unfortunately, her captain, chief engineer and seven other members of the crew were lost. The ship had enjoyed a long history on the lakes since being built in 1881. She was built as the *Wisconsin*; renamed the *Naomi* in 1899; renamed the *E. G. Crosby* in 1910; renamed the *General Robert M. O'Reilly* in 1919; renamed the *Pilgrim* in 1920; and finally renamed the *Wisconsin* in 1924. It was felt the age of the ship was the chief cause of her sinking, since many newer ships were able to withstand the storm. The *Wisconsin* was 209 feet long, with a beam of 40 feet. The wreck

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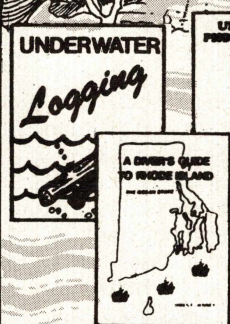
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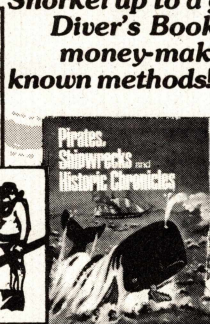
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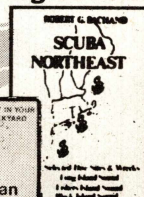
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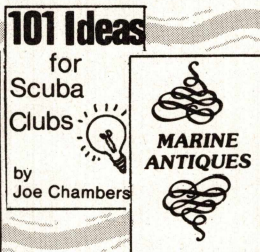


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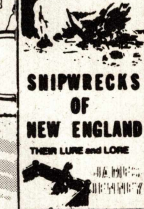
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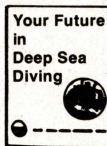
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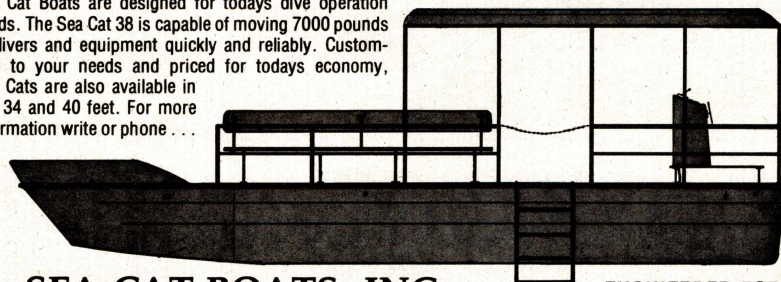
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was visited by divers in the spring of 1935 and then forgotten. It was relocated by Dick Race in 1961 with the help of Frank Hefling, one of the divers who had been there in 1935! It sits upright in 130 feet of water, five miles offshore, and about seven miles southeast of Kenosha light. (Loran C: 49624.4 and 33174.4.)

Diving on this wreck should be restricted to those with prior wreck diving experience, since the minimum depth is 90 feet. When last visited the wreck still had portholes in place, and several vintage vehicles, including a Reo truck, just inside the stern cargo opening. Dishes, and other items of interest await the diver equipped to penetrate her.

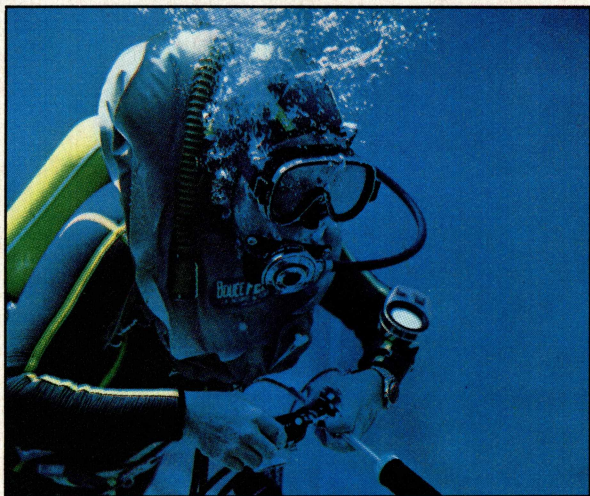
The two-masted schooner *Kate Kelly* was a victim of a furious gale. Built in Tonawanda, NY in 1867, she was 126 feet long and 26 feet wide. On May 13, 1895, she was caught in winds of 65 miles per hour. Although her captain, Hartley J. Hatch, was an experienced seaman, the gale was too much for the ship to withstand. The ship stranded on a reef about two miles northeast of the Wind Point lighthouse, north of Racine, Wisconsin. After about an hour, the ship came free of the reef, only to sink three-quarters of a mile south of it. Several of the crew were seen clinging to her masts, which were sticking out of the water about 15 feet. All were lost, however, since the lifesaving crew was unable to reach them in the heavy weather. The ship had left Cheboygan, Michigan with a cargo of 6000 hemlock railroad ties on May 8.

The *Kelly* was visited by a diver several days after she sank. He reported finding no bodies, and also reported that the ship was badly broken up. Railroad ties were found floating miles south and it was first thought that the ship had sunk near Kenosha. The diver, however, confirmed that the wreck was indeed the *Kate Kelly*. It lies in 54 feet of water, one and three-quarter miles east of the Wind Point lighthouse. (Loran C: 49467.3 and 33053.5.) The wreck was discovered by Sam Mareci and Dan Johnson in July, 1981. Divers will enjoy looking for deadeyes and pulleys in the sand around the wreck. The windlass is still in place and on days with good visibility makes for some excellent pictures. This is a very good site for the wreck diver who wants something just a little bit deeper, with better visibility.

The wooden steamer *Norland* sprang a leak and sank on November 13, 1922. She was 120 feet long and 30 feet wide. The ship had left Chicago on Saturday, November 11, for Milwaukee with a cargo of pharmaceuticals, plumbing supplies and toys. The ship had run into a storm and put into Racine, Wisconsin for

(Continued on Page 32)

Why the Rolex Sea Dweller never gets the bends.



Divers are not the only ones to experience decompression sickness, or 'the bends'. Watches, as well as people, can suffer in much the same way.

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"I've actually known watches to explode as a result."

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T. Walker Lloyd has kept in touch with the development of this unique feature since its conception.

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"In effect, this means that the watch decompresses with the diver."

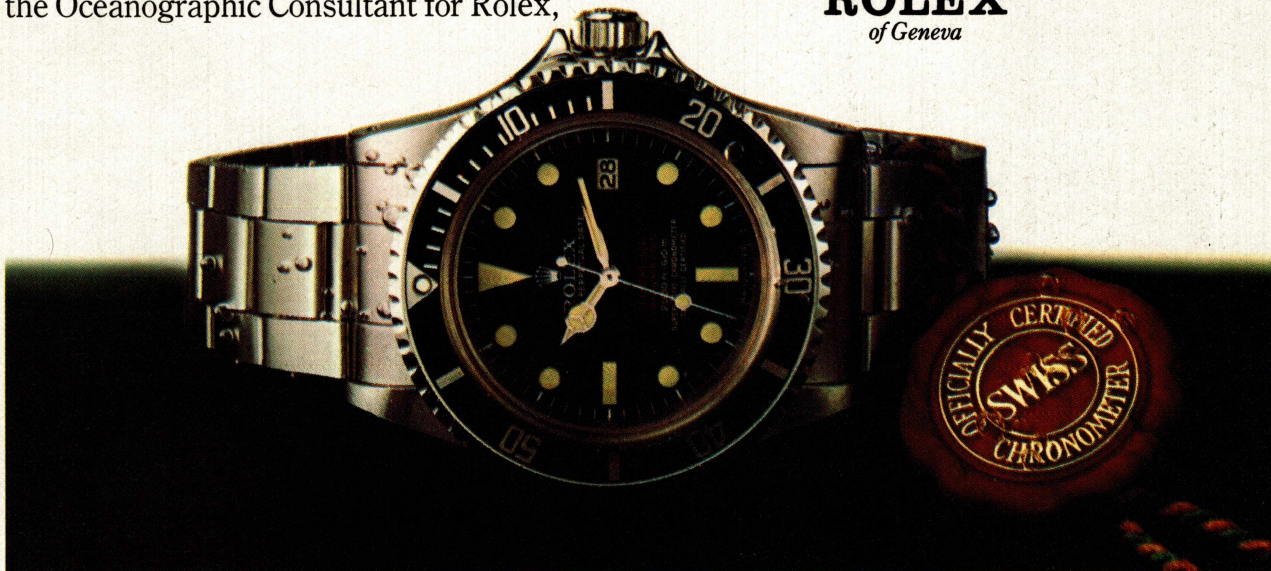
T. Walker Lloyd has worked as diving supervisor for Dr. George Bass, when excavating a 4th-century Roman wreck in the Aegean Sea.

He was also a member of the first team to saturate on 95% nitrogen and 5% oxygen at a depth of 100 feet. During the experiment, the team made working dives of up to 265 feet on compressed air. So he understands better than most the importance of highly accurate and reliable equipment.

The Rolex Sea Dweller is certainly a remarkable watch. And yet apart from the gas escape valve and a specially strengthened case, it is made in exactly the same way as any other Rolex Oyster.

Which means that if T. Walker Lloyd ever gets tired of underwater exploration, his watch will be equally at home in the frozen Arctic, the heat of the Sahara Desert, or at the top of Mount Everest.

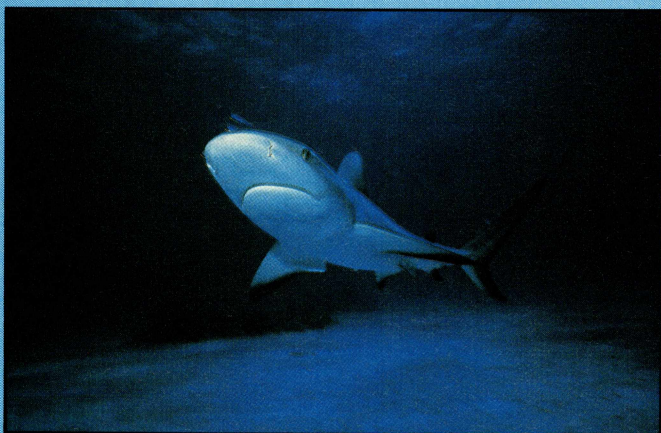

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Pictured: The Rolex Sea Dweller Chronometer. Available only in stainless steel, with matching bracelet.



"Bouquet," S.R. Bakst • Grand Prize/First Place Saltwater Macro



"Encounter," Brian Kenny • First Place Saltwater Wide-Angle



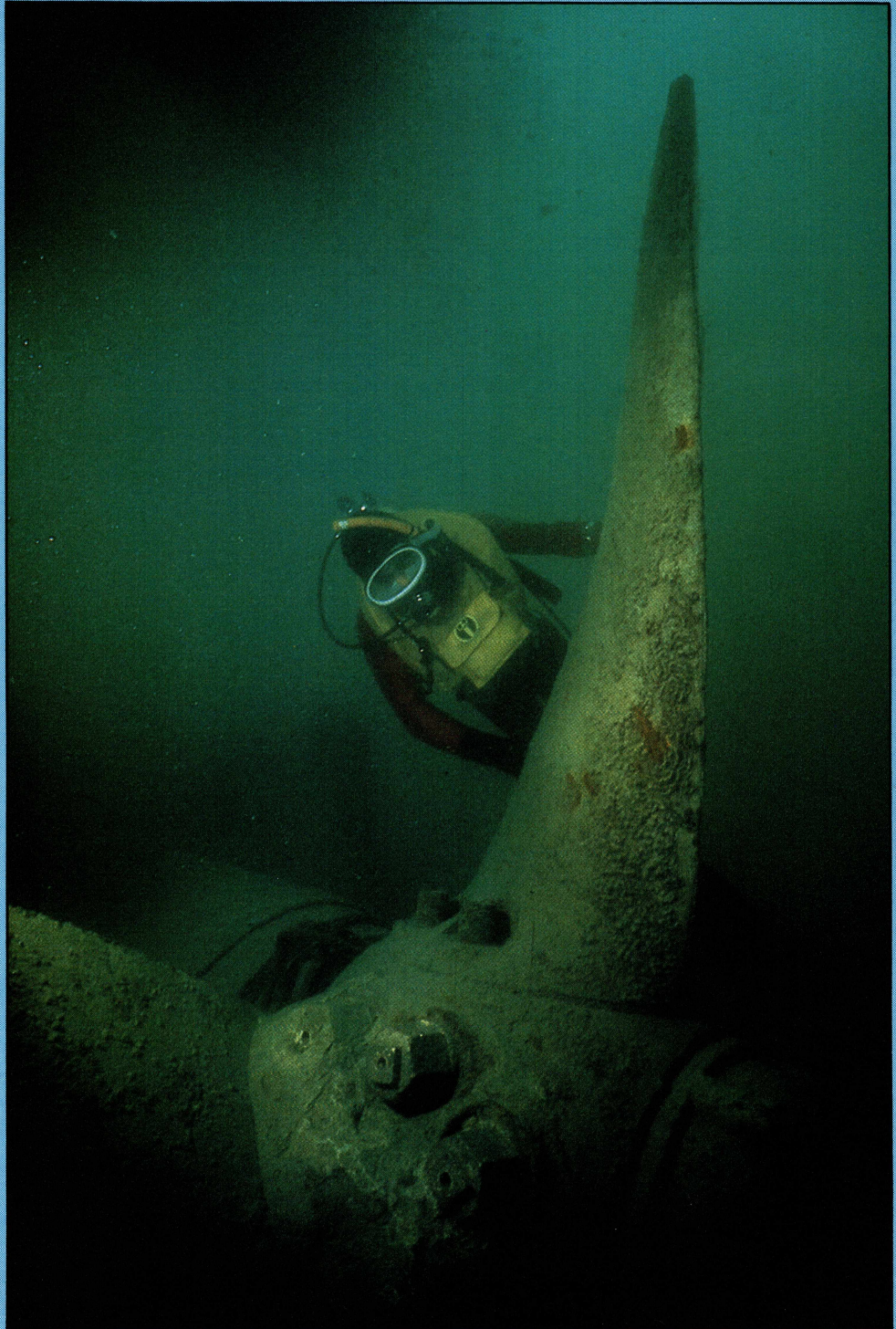
"Surprise," Jim Kozmik • First Place Freshwater Macro

Results of the Underwater Society of America's National Competition

BY PAULA NOVOTNY

USA Photo

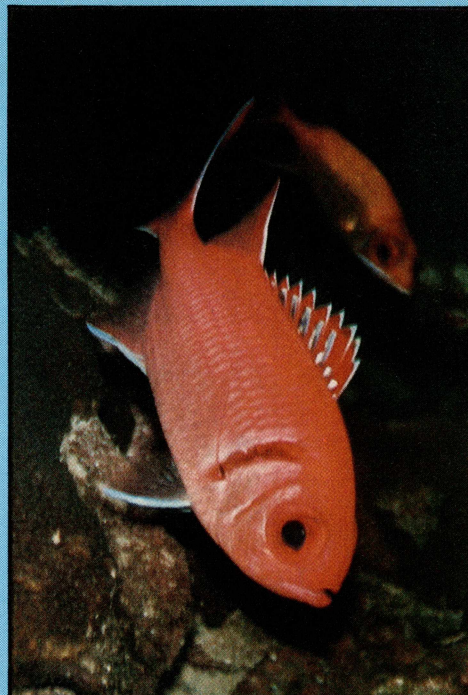
WINNER



"Blade," Jim Kozmik • First Place Freshwater Wide-Angle



"Elegant," Elmer Munk • First Place Saltwater Wide-Angle Print



**"Out of the Dark," Delight Brogan
First Place Salt and Freshwater 110 Prints**



"Stonefish," R.G. Ross • First Place Saltwater Macro Print

At Our World-Underwater, held in Chicago last May, the winners of the 1982 Underwater Society of America Photography Competition were announced. This international contest is designed to provide nonprofessional underwater photographers all over the world with the opportunity to be published and win hundreds of dollars in prizes.

There were a lot of super entries by many fine amateurs this year and a special thanks goes to our permanent competition judges, Paul Tzimoulis, Rick Frehsee and Gale Livers. Many thanks also to all the manufacturers and organizations who donated \$4,500 in prizes. These were distributed to the first three winners in each category.

The competition will be held again from December 1, 1982 to February 1, 1983. Prizes next year will include a week's scuba trip to Bonaire, courtesy of Peter and Alice Hughes of Dive Bonaire and the Flamingo Beach Hotel; a Nikonos IV-A from Nikon; a Kodak slide projector and thousands of dollars in other prizes. To receive an entry form send a self-addressed, stamped envelope to: Paula M. Novotny, Director of Photography, 9702 E. 12th St., Indianapolis, Indiana 46229.



"Kelp Motion," Dr. Inga Behr • First Place Salt and Freshwater Black/White Prints

Entrants in the Underwater Society of America Photography Competition compete for the chance to have their photos published. In addition to that, entrants compete for hundreds of dollars in prizes. These prizes include: diver jewelry, dive logs, travel and marine life books, film, knives, regulators, cameras, strobes, underwater housings, BC's, gear bags and lift bags.



Technifacts

BY E.R. CROSS



Last month we provided a review, as well as questions and comments concerning previously published articles. This month we'll answer more questions and review other subjects, some in the field of commercial diving.

ALUMINUM VS STEEL TANKS

A reader wrote asking about the effect of heat on aluminum and steel cylinders: "Some months ago there was considerable publicity concerning divers who had repainted their aluminum tanks using a heat treating process—the tanks exploded while being filled. I would like to refinish several steel tanks by removing all

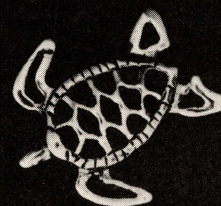
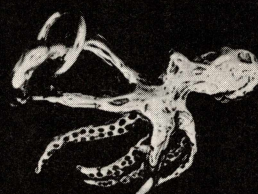
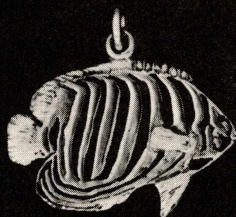
paint from the exterior and using a cold galvanized paint process. The paint can instructions suggest sand blasting to remove all traces of old paint. Will this affect the steel's tensile strength? Will this cold galvanizing treatment be an effective rust and corrosion inhibitor?"

In some respects aluminum is probably a better metal for scuba tanks than steel. This is particularly true where the rate of corrosion of the two metals is concerned. Aluminum corrodes much slower than does steel under identical conditions and, once the corrosion film is formed, corrosion virtually stops. In general, however, steel is a more forgiving metal than is alu-

minum. This is particularly true where heat is concerned. Aluminum cylinders that have been heated past a certain temperature (about 350°F) are weakened and will no longer tolerate pressure. The few aluminum diving cylinders I know of that have either exploded or failed to pass hydro have been through fires. Steel cylinders, on the other hand, if heated and not quenched and cooled rapidly, will not be affected appreciably. However, any scuba cylinder, regardless of material, should be hydrotested prior to reuse after being subjected to heat from a fire. Even steel can be damaged by very high temperatures.

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by Robert L. Straight



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Sand blasting steel cylinders, if done properly and only to remove paint and minor corrosion will not weaken the material. Excessive blasting, as might occur if a nozzle were held in one place on a tank for several minutes, could weaken a cylinder.

Galvanized scuba cylinders are better than those that have been painted or epoxied. Galvanizing helps prevent corrosion because the relatively high electrode potential of the zinc coating makes it anodic. Also, the zinc coating corrodes far less rapidly than does steel. More importantly, when zinc and steel are exposed to a corrosive media, such as air or water, and particularly salt water, the zinc is attacked first. It will, almost always, develop a corrosion cell that will actually provide cathodic protection (deposit zinc ions on the steel). This protects the steel from corrosion by depositing a zinc coat on any bare metal.

There are several ways that scuba cylinders can be galvanized. The two most common methods are the hot dip process and the electrogalvanizing process. Hot dip galvanizing involves first pickling the metal to provide a clean surface for the galvanizing, followed by a dip into molten zinc. Pickling is done by dipping the metal object into a solution of sulfuric acid (5 percent to 20 percent) which dislodges particles of dirt or grease. Sometimes the pickling agent is a solution of

hydrochloric acid (5 percent to 10 percent) which acts chemically on both the underlying steel of the metal object and any scale that might be present. The use of either pickling solution causes some loss of the base metal but hydrochloric acid causes a much greater loss than sulphuric acid. The molten zinc used in the hot dip process is maintained at a temperature of about 850°F.

Electrogalvanizing (cold galvanizing) requires greater care and greater difficulties are encountered in obtaining a correct zinc coat. However, this process has a distinct advantage over the hot dip process because there is no adverse affect on the steel owing to heat.

Zinc based paints that can be applied to metal objects, including scuba tanks, will help protect from corrosion but not to the extent that hot dip or electrogalvanizing will. The ones that I know best are Dimetecote No. 5 and No. 6 and Matcote RB-188. National Paint Co. also makes a zinc based paint but I have never used their product. Zinc based paints, or coatings, are two part products consisting of a zinc powder and a liquid. The principle difference among them is in the liquid. The difference in the final coating is the drying time and hardness of the finish.

Zinc based coatings for dive cylinders should be applied by spray gun (after sandblasting the tank) to about three mil (dry) thickness.

It has been my experience that zinc based paints have a relatively short shelf life; perhaps about six months with proper storage conditions. After that the liquid becomes thick, stringy and unfit for use. This is particularly true if air reaches it. Aerosol cans of zinc paint offer a little better protection than regular spray paint, mostly because of the liquid and the durability of the finish.

The expected life of a scuba tank is about 10 to 15 years. During this period it will be hydrostatically tested at least every five years; more often if subjected to extreme physical abuse. There is a good chance that a scuba tank that appears to be in need of reglazing may, in fact, be ready for replacement.

HULL CLEANING FOLLOWUP

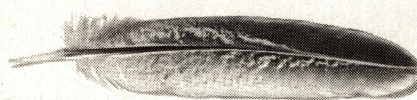
In April 1981, Technifacts dealt with cleaning boat and ship hulls. A hull scrubbing equipment company was mentioned but the address was omitted. Two SDM readers, one in Spain and one in South America, wrote asking for it, so here it is: Sub Enterprises, Inc., P.O. Box 16531, Irvine, CA 92713.

Another source for hull scrubbing equipment (the U.S. Phos Marine Brush System) is M & E Marine Supply Co., P.O. Box 601, Camden, NJ 08101. The catalog lists the large three-brush and the smaller one-brush scrubbers.

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TECHNIFACTS

WIRELESS COMMUNICATION

Keith H. Pearson, La Grange, Illinois voiced the feeling of several divers when he wrote, "I am very interested in obtaining an underwater wireless communication system and would look forward to buying possibly several sets if they are not priced beyond reason. I have one set of underwater phones and am very disgusted with the price, intelligibility, battery life, etc. I am tired of flipping birds (?) at my buddies. I'd like to talk to them in person."

Before listing the three most tested and talked about wireless communication devices it might be well to point out a few facts of life about communicating underwater without wires. First, to convert voice to electrical energy that can then be transmitted through the water requires a lot of energy. To produce this energy in a package powerful and small enough to be of use to a diver takes a lot of engineering and construction technique. Thus it is going to cost money.

Secondly, batteries are not going to last long. Cheap units have come and gone over the years, basically because

they were not useful due to lack of power and because they were unintelligible even over a distance of a few feet. The units on the market today are more powerful and, mostly, 90 percent intelligible.

In commercial diving one of the most frequently encountered is a unit manufactured by EFCOM Communication Systems, 18851 Bardeen Avenue, Irvine, CA 92715. It is designated SC-100M Wireless Underwater Communication System with a voice operated transmitter. The basic diver unit is convertible, with an adapter, to a topside unit. It has such options as power booster, noise cancelling facemask, and others.


The Hellephone, sold by M & E Marine Supply Co., P.O. Box 601, Camden, NJ 08101, is probably the most powerful of the wireless systems. The largest unit (model 3600) is capable of providing clear communications over a distance of two miles. This unit is designed primarily for communication between a submersible and a surface ship. Other Hellephone models, the diver model 3117 and surface model 3118, are for use between the diver and the surface. However, they are quite powerful, having a power output of one-half watt. The diver unit is rated for 300 feet and maximum range, in quiet ocean water, of about 2500 feet.

Sound-Wave Systems' Wet-Phone is, again, one of the newer breed in power and intelligibility. At present it is the only

unit approved by the U.S. Navy. Wet-Phone is manufactured by Sound-Wave Systems, a subsidiary of Microsemiconductor Corp., Costa Mesa, CA. The company makes underwater sonar equipment.

SUBSEA MANNED ENGINEERING

Most commercial divers and nearly all commercial diving students will, sometime in their lives, come in contact with some type of hyperbaric system. In the past there was no one source of information about the numerous hyperbaric systems and their many uses. Now this has changed. *Subsea Manned Engineering*, by Gerhard Haux, published by Best Publishing Company, 23005½ South Avalon Blvd., Carson, CA 90745, has filled a great need for complete information about the multitude of chambers, simulators, deep diving systems, and habitats found throughout the commercial diving industry.

Every commercial diver, and every commercial diving student, should carefully study this well illustrated book. Becoming familiar with all the systems discussed and illustrated in its 538 pages will provide a near working knowledge of any type hyperbaric system. The book is also suitable for use by engineers and designers and will be of help in designing and planning diving and decompression programs. 



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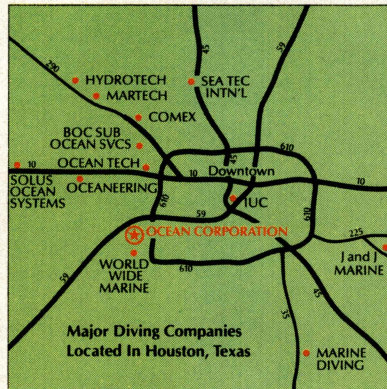
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Why Houston?

BECAUSE

The Ocean Corporation is located in Houston and more commercial divers are hired in Houston than in any other place in the world. Twelve diving companies are located in Houston including three of the four largest in the U.S. Many others are located in the nearby New Orleans area. The demand for divers is so great in Houston that large locally based diving companies like Ocean Systems, Hydrotech Systems, Martech International and Sea Tech International have hired many of our students for part-time work while they were attending school. Over 90% of our recent graduates went to work for these and other local diving companies when they completed our program. Houston is the place where the action is...the commercial diving, offshore construction and oil industry capital of the world.



BECAUSE

The Ocean Corporation is a commercial diving company, not just a school. Our facilities, equipment and training aids are the best, and our diving systems are as up-to-date as possible... because much of the equipment is used by our diving operations division to perform actual diving contracts in the field. Ocean Corporation has successfully completed many underwater jobs for various industrial clients over the years... including specialized underwater inspections, maintenance and repair work. For example, we did the world's first commercial underwater repair job in a nuclear power plant. And most of our divers have been graduates of our own school.

BECAUSE

The Ocean Corporation is a convenient and exciting place to go to school. Houston is one of the fastest-growing and most dynamic cities anywhere. It is a city of expansion, energy and youth (the average resident's age is in the mid-20's). Houston offers every conceivable kind of entertainment, from sports events, ultra-modern discos and open-air theater to rough-house local rodeos, chili cook-offs and the new Texas-size



country-western dance clubs. Reasonably priced adult and singles apartments are readily available within walking distance of the school, and fast-food to luxury restaurants are nearby. The semi-tropical climate is wonderful, the sport diving is great and the folks are friendly.

BECAUSE

The Ocean Corporation management and instructor staff have long-term experience in the international offshore oilfield diving business. Retired ex-military divers and sport scuba divers don't run the school...commercial divers do. For example, the President of The Ocean Corporation, Larry

Cushman, was Vice President and Europe/Africa Area Manager for Ocean Systems, Inc. for three years...with responsibility for all North Sea diving and underwater construction operations. He also worked six years as a manager for Oceaneering International, Inc., another of the world's largest commercial diving contractors. Ocean Corporation managers and instructors know today's diving business...first-hand, from recent experience.



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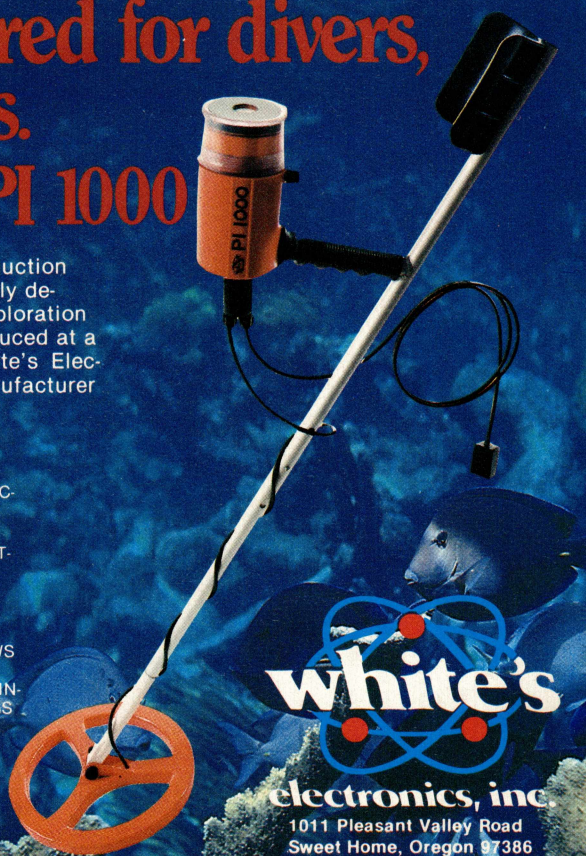
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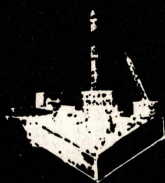


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LAKE MICHIGAN WRECKS

(Continued from Page 22)

safety. When the storm subsided, she put out again for Milwaukee. Only when she was well out into the lake did her crew realize the extent of the damage that had been done. The ship began to leak badly, but at first it was thought that it would be able to reach Milwaukee. For two hours the crew worked at the pumps, trying to keep her afloat. The captain could see that the water was gaining on them, and ordered the crew of 19 to the boats. Just 15 minutes after the last boat was launched, the ship sank. The crew reached shore, south of Milwaukee, without further mishap.

The wreck can be found about 11 miles southeast of the Milwaukee light, three miles offshore (Loran C: 42320.4 and 32999.7). She was found by John Steele in 1959 in 55 feet of water and upright. Her boiler and stern are the only recognizable parts above the hull, she has completely fallen apart. Visibility is limited, as she has settled several feet into the clay bottom. Of interest to divers will be her cargo. Many bottles and jars can still be found.

The car ferry *Milwaukee*, 338 feet long and 56 wide, left its home city for Grand Haven, Michigan about 3:00 pm on October 22, 1929 never again to be seen on the surface. The ship, loaded with 25 rail cars, headed out into a strong northeast gale of between 34 and 37 miles per hour. It proved to be a fatal mistake. Ferryboat captains in general, and Captain McKay of the *Milwaukee* in particular, had an affection for sailing in all types of weather. Captain McKay and 58 others paid the ultimate price for that.

The wreck is three and one-half miles offshore, about seven miles northeast of the Milwaukee light. (Loran C: 49208.8 and 32943.4.) She sits upright in 135 feet of water. She sank rapidly, as the terrific air pressure caused by the water filling the ship blew all her upper cabins off. They now lie beside the ship. She is buckled inward just above her portholes and has several cracks up to six feet wide in her hull. Divers can get to the main deck at about 90 feet. This wreck should be visited by experienced wreck divers only. Although the wreck was located by John Steele in 1972, many artifacts are still being found. Many portholes are still in place, and brass goodies await the more adventurous.

Many wrecks await the diver with the patience and time to research them, and the equipment to find them. A few of them worth finding would be: schooner *David A. Wells*, lost in 1880; schooner *Wings of the Wind*, lost in 1866; schooner *Wells Burt*, lost in 1883; schooner *Seabird*; sidewheeler *Lady Elgin*; sidewheeler *Rotarian*—there are many, many others.



DAN

DIVING ACCIDENT NETWORK

Immediate Medical Assistance for Dive Emergencies

BY ARTHUR DICK, M.D.

The number of recreational divers has risen dramatically in recent years, and now more than 100,000 are certified each year. Sport diving has an excellent safety record, but when accidents do occur, they have the potential for serious injury.

Of course prevention is the ideal way to handle the risks of diving. Training and certification programs teach safe diving methods, but from the accidents which the Diving Accident Network (DAN) has helped treat, it seems that good dive habits may fall into disuse. Many divers who have accidents have become careless and omit decompression, trying to cheat the decompression tables. This can lead to disaster since some parts of the tables have a two percent bends risk even when used correctly. Because of this and the tremendous daily variability and individual differences in a diver's susceptibility to decompression problems, a sport diver should use the tables conservatively.

Many navies in the world use the next deeper depth beyond the customary next depth in planning their dives. Sport divers would therefore be wise to stay short of the no decompression limits or also adopt the "one extra depth" rule in planning a safe dive. This is especially advisable in dives involving cold water or heavy exertion.

Another very sensible procedure is to use a short five minute stop at ten feet after *all* no decompression dives. This allows the tissues with fast gas exchange a chance to release most of this harmlessly through the lungs. The current understanding of decompression sickness and the common presence of asymptomatic gas bubbles in blood after traditional no decompression dives emphasize the value of a shallow stop rather than no stop for safe sport diving. The advantage of using the shallow stop rather than one extra depth is that it does not reduce bottom time.

Even careful divers can have an accident. There are a number of ways a diver can prepare for such an occurrence. All new divers learn about the bends and air embolism, but after years of trouble free underwater adventures, they tend to forget about the dangers and the symptoms. Rapid treatment depends on the diver's

early recognition of the symptoms and his/her decision that medical help is needed. Divers who think they may be injured should promptly call and discuss their problems with someone knowledgeable in dive medicine. Once it is determined that a dive accident has occurred, it is important to remember that this is predominately a medical problem and requires *medical* evaluation and treatment.

Unless there is an appropriate treatment chamber nearby (of which there are few) the nearest hospital emergency room is the first stop. This is often overlooked in the concern caused by the possible need for a chamber treatment. Some injured divers need recompression, but *all* need medical treatment of which recompression is only one part. Therefore, knowing the location of the nearest hospital is extremely important. This is more useful than the number of the nearest recompression chamber. Few chambers have 24 hour telephone coverage or a continuously on call physician experienced in dive medicine. Unless you are in Dade County (Florida) or LA County (California), where emergency medical systems exist for injured divers, the problem of finding the appropriate chamber should be considered *only after initial medical evaluation and early treatment*.

CALL DAN (919) 684-8111

A diver is still responsible for ensuring that he has access to dive medical advice. One of the best ways is to know the number of the National Diving Accident Network (DAN). You can always reach a dive physician for treatment advice as well as assistance in arranging referral and transport to the appropriate chamber with this number: (919) 684-8111. The DAN physician can also advise the emergency room. This ensures proper diagnosis and avoids unnecessary treatment delays.

Transportation to a recompression chamber is, unfortunately, much more costly than many expect. Chambers may be far from the injured diver and rapid air transport may be necessary but expensive. Commercial long distance ambulances and air transportation services often will not respond without firm assurance of payment. This is a difficult reality

to cope with during the awkward hours of a medical emergency. Since a chamber is only useful to the diver who can get to it, excellent medical insurance is an important part of safe dive planning.

HOW DAN WORKS

To use DAN, a diver or physician dials (919) 684-8111, and asks for DAN (collect calls are accepted in an actual emergency). The call is answered by an operator at Duke University Medical Center in North Carolina. If the call is in regard to an injured diver, the caller is connected with a dive medicine physician. There is one available 24 hours a day. This physician may advise the caller directly, or refer him or her to a local diving physician. If needed, the physician will work with a DAN Regional Coordinator to arrange referral and transport to an appropriate treatment facility.

DAN Regional Coordinators are qualified in dive medicine and know what treatment facilities are available in their regions. In addition, each region has trained medical staff and suitable chambers available continuously.

OTHER SERVICES

DAN also provides other services. Significantly, it is a clearinghouse for information on dive accidents and their treatment. Information is collected without identification of the victims and studied on a national level. Then, it is made available to those participating groups, such as certifying agencies and equipment manufacturers, who are responsible for training and equipping divers for safe and enjoyable participation in our sport. Of course, all names are deleted from published reports. In this way, DAN helps promote dive safety.

In addition, the people at DAN have prepared a comprehensive *Diving Accident Manual* that describes acute signs and symptoms of major dive accidents and gives advice on effective early treatment. The manual is based on experience gained from the analysis of over 180 cases DAN has helped treat in the past 18 months. The manual (\$3.00) and more information are available from: Diving Accident Network, Box 3823, Duke University Medical Center, Durham, N.C. 27710.

Sad Saga of the Jacob Jones

The Tragic Demise of a WW II Destroyer

BY ELLSWORTH BOYD

Like the old Japanese proverb: "A bee stinging a weeping face," (one misfortune after another) the *USS Jacob Jones* succumbed to double jeopardy on February 28, 1942. First she took two direct hits—one fore and one aft—from the German U-boat 578. Then the 1100 ton destroyer became, as one survivor said, "its own worst enemy," a victim of its own depth charges.

The *Jacob Jones* or "Jakie," as the crew called her, was part of a roving anti-submarine warfare patrol cruising off Cape May, New Jersey, in an effort to stem the losses of merchant ships along the East Coast at the outset of World War II. Standard operating procedure was to pre-set the depth charges so they would explode at different depths when fired at enemy subs. Consequently, as the *Jakie* sank, her own charges went off at various intervals, blowing some of her crewmen out of the water and contributing to the high list of casualties.

Only 11 men survived the attack. One hundred thirty died, including the skipper, Hugh D. Black, and all his officers. It was a tragic end for a gallant ship and many brave men.

Captain E.A. Rehwinkel of Hamburg, Germany was skipper of the U-578, a brand new submarine launched in May, 1941 and assigned to search and destroy American naval and merchant vessels off the Delaware capes. The following excerpts are from the captain's log, turned in to the German high command when the U-578 returned home for supplies and reassignment:

"We were ready for action on a pre-dawn patrol when I sighted a ship with no lights, running hard to the starboard. I could not tell what it was, for all I saw in the haze was a silhouette, perhaps a cruiser I guessed. Torpedoes one, three and five were cleared and we maneuvered to the fore of the vessel to initiate

our attack topside. We surfaced and I planned an immediate strike so that we could disperse into deep water before dawn. We moved in so close we were surprised they did not see us.

"Still, we could not determine what kind of ship it was because of the haziness. We fired two torpedoes three meters deep and continued moving toward the vessel. I saw four smokestacks and determined that it might be a destroyer. We were so close we had no more time to determine what it was before the first torpedo struck. The first direct hit aft of the bridge created a strong explosion and heavy black smoke darkened the sky. The second direct hit in the afterdeck was followed by a series of loud detonations so violent that we temporarily lost our electricity. Still running topside, we cruised past the sinking vessel, through the thick black smoke, and returned to the open sea."

Captain Rehwinkel was correct on his second guess. The four-funneled, 314 foot silhouette was a destroyer, replete with four big deck guns, two machine guns and 12 torpedo tubes, none of which saw action in the pre-dawn assault. The smoke and darkness prevented the U-boat captain from seeing all of the bizarre spectacle he created with his two direct hits.

According to survivors of the *Jacob Jones* the first torpedo struck slightly aft of the bridge, wreaking total havoc there. It exploded the ship's magazine and the ensuing blasts sheared off everything forward of the point of impact. It completely destroyed the bridge, chart room, officers' and petty officers' quarters, and communications center. The ship stopped dead, unable to send a distress signal. The second hit was about 40 feet forward of the fantail, destroying the after crew's quarters and carrying away the after part of the ship above the keel plates

and shafts. In essence, the once mighty destroyer became a ship with little fore and no aft. Only her midships was intact.

One of the survivors, Joseph Tidwell, was in the galley when the first torpedo struck. "A terrific explosion shook the galley," he said, "scattering dishes and silverware all over the place and literally burying me in pots and pans. I knew what it was right away. Sailors have dreams of being torpedoed and this was a nightmare come true. About 15 seconds later there was another explosion and I raced topside to see how badly we were hit.

"The *Jakie* was reduced to a floating hulk with fore and aft blown away and only her midships remaining. Her watertight bulkheads were the only things keeping her afloat, despite constant pounding by the rough seas. Surprisingly there was no panic. The crew set about quickly but quietly launching the rafts. I glanced out over our port side and through the thick smoke and stench of scorched metal I saw the U-boat, about 100 yards away. The captain was in the conning tower sizing up our losses. Then like a ghost ship, the sub swung to her starboard and disappeared in the haze."

Except for one man, Thomas Moody, who miraculously escaped from the after engine room, the survivors where all amidships when the torpedoes struck. "I was knocked down by the shock of the first explosion," Moody said. "Then I grabbed my coat and life jacket and rushed topside. I tried to launch a lifeboat, but the launching winch was smashed, so I went down to the galley for some coffee. There was no way I was going into that cold water without something warm in my stomach."

Moody filled a thermos with hot coffee while George Pantall dragged a box full of underwear from a locker. "We each pulled on three sets of longjohns as protection for what lay ahead," Moody said.

"Then we went back on deck and cut loose three life rafts. I jumped overboard into 40° F water and swam toward one of the rafts. Just as I grabbed hold, there was an explosion on the ship that blew me away from the raft. I swam back and got on the raft, the 13th man aboard."

Pantall remained on the deck until the water lapped at his ankles, then he leaped into the sea. Two minutes later an explosion shook him, just as it did Moody, separating him from his raft. "I got hold of the raft again," Pantall said, "and clung to it for an hour before they found room for me and pulled me aboard." The raft measured only five by nine feet and of the 14 men on it, only Pantall, Moody and two others were able to hang on until they were picked up.

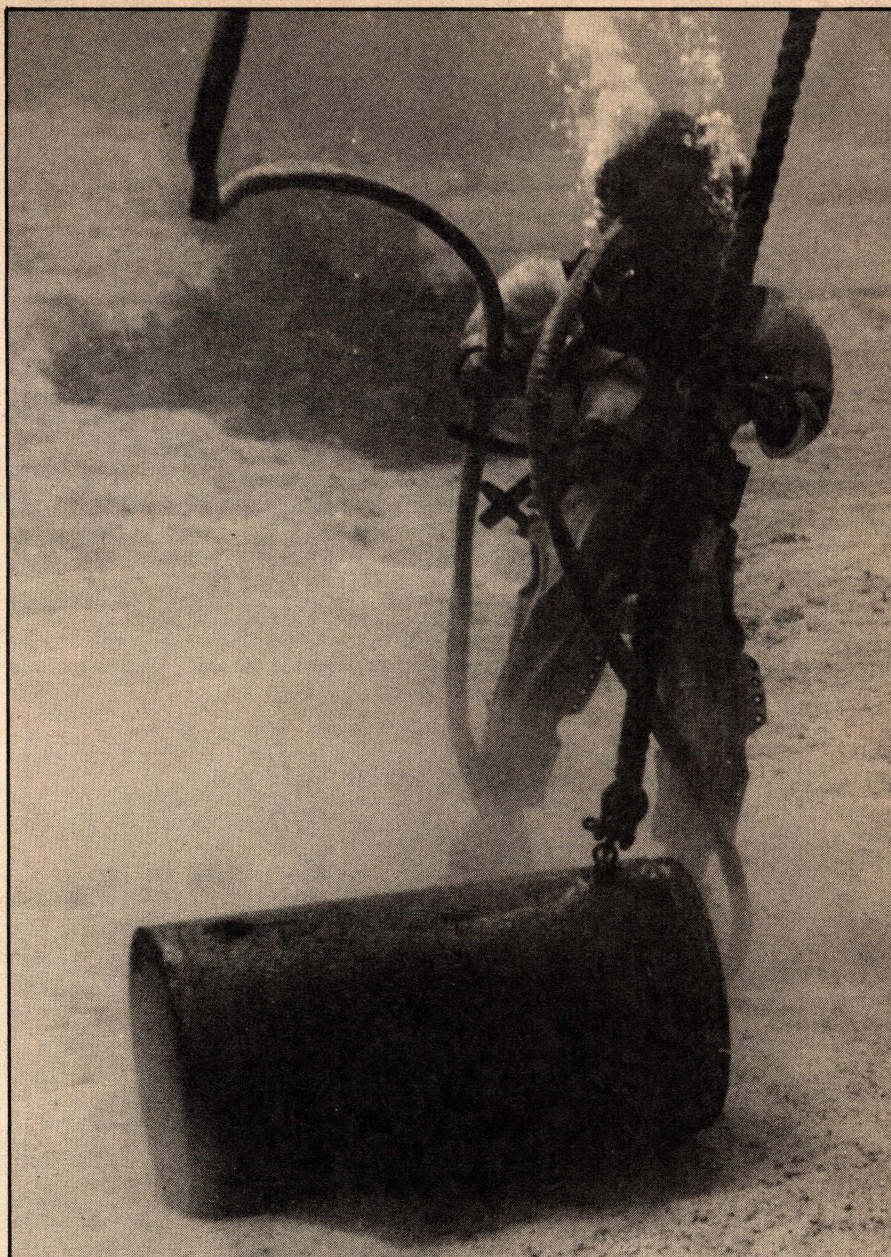
The *Jacob Jones* remained afloat about 45 minutes, allowing the survivors to clear the stricken ship in four rafts. Within an hour of the initial explosion, the destroyer plunged bow first into the icy Atlantic. Although most of the casualties occurred aboard ship, a few more were added to the list when the stern went under. That's when her remaining depth charges went off as she sank, killing some crewmen who were adrift in the water. There were four different series of explosions in all: the torpedoes, the ship's magazine, depth charges aboard ship while she was afloat, and depth charges in the water as she sank.

An Army observation plane sighted the survivors about four hours after the sinking and reported their position to *Eagle 56* of the Inshore Patrol. Three hours later, when blustery winds and rising seas forced her to abandon the search, the *Eagle 56* had rescued 12 survivors, one of whom died en route to Cape May. The search for the others continued for two days, but none was ever found.

On a cold Sunday morning, April 2, 1967 Dr. Bill Scheibel, a seasoned East Coast wreck diver and wreck researcher, huddled in his sleeping bag aboard the *Big Jim II*. Clutched to his bosom were the results of nearly two years of research on a vessel that intrigued and nearly obsessed him—the detailed history and saga of the *Jacob Jones*. Scheibel had been on dozens of wrecks off Maryland, Delaware and New Jersey, but he had never found the *Jakie*, nor talked to anybody else who had discovered her. But A.J. Dulinski, a veteran New Jersey charter boat captain, had recently picked up something big on his scanner and he figured it might be what Scheibel was looking for.

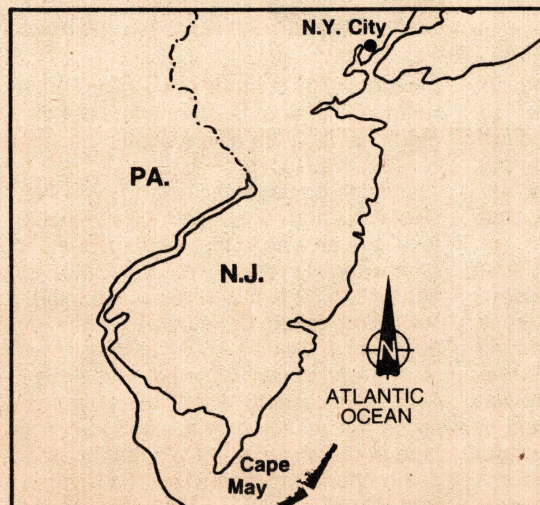
Three hours out of Cape May, Dulinski cut his engine and dropped a grappling hook 145 feet deep where it snagged on the wreck. Scheibel was so anxious to explore. John Dudas, another seasoned East Coast wreck diver, accompanied Scheibel on his dive into history.

"My heart was pounding," Scheibel

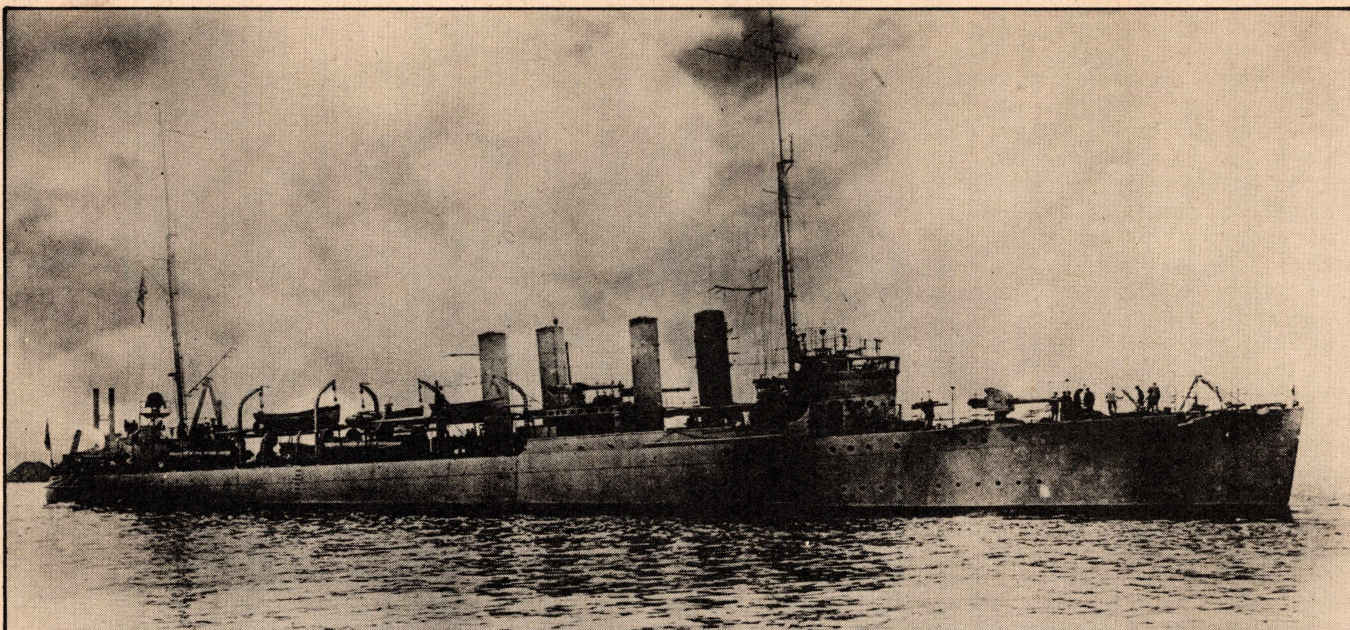


photo/courtesy U.S. Navy

Navy divers removed much of the dangerous ordnance from in and around the *Jacob Jones*. Divers should still be careful as unexploded depth charges may still be present.



This map shows the approximate location of the *Jacob Jones* in relation to the New Jersey coast. The vessel lies in about 130 feet of water.



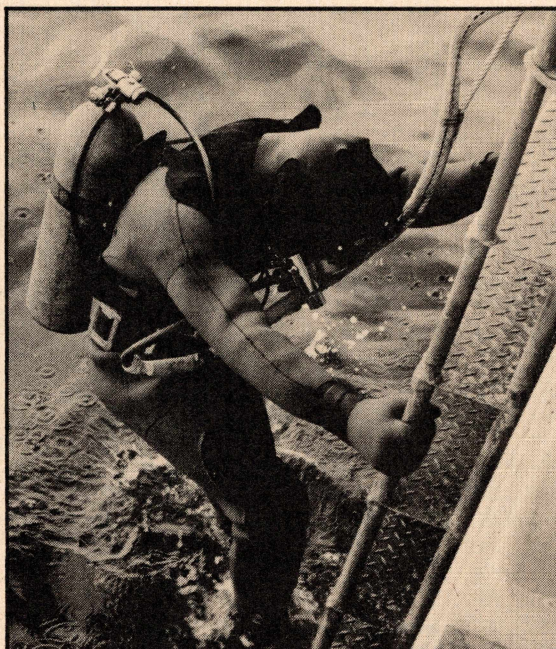
photo/courtesy Mariner's Museum

The destroyer, *USS Jacob Jones* was part of a roving anti-submarine patrol cruising off Cape May, New Jersey when she was torpedoed by the German submarine U-578. Many of the ship's crew were killed when her own depth charges exploded as she sank.

says, "when 100 feet down we saw spread out beneath us a ship of immense proportions. She was upside down, keel skyward, running off through the gloom in either direction. She was covered with a rich carpet of marine growth, indicating she had been down for a long time. At the stern, her rudder came to within 110 feet of the surface and was flanked by three huge propellers. That's when I knew this was *not* the *Jacob Jones*. The ship I sought was a twin-screw vessel. Further exploration revealed a wreck intact, not broken in two, and she had a length and beam much larger than the destroyer. Some of her large portholes were still in place, while others were lying on the silt bottom. Later, by consulting shipwreck expert Jean Haviland, John and I discovered that we had dived the plush ocean liner, *Northern Pacific*."

"Later that day," Scheibel says, "we hooked into another wreck and my hopes soared once again. This time Captain Dulinski hit the jackpot. There's not much left of the *Jacob Jones*. The U-boat did a demolition derby on her, along with the depth charges. Broken in two, the sections drifted apart. The main section, about 130 feet deep, lies demolished in the sand with brass valves, twisted beams, boilers and shell casings scattered all over the bottom.

"The stern, at least a mile inshore from the midships, at about the same depth, extends 30 feet up from the sea floor. Divers must be careful when exploring this part of the wreck. Evelyn Dudas was chipping away at what she thought was a cargo drum, when John and I swam by and signaled to her to stop. She got our message and quit posthaste when she realized that the drum was an unex-



photo/courtesy U.S. Navy

ploded depth charge! Navy divers have removed some of the ordnance, but they didn't get it all, so divers should be wary of what they touch."

Charter boats from Indian River Inlet, Delaware and Cape May, New Jersey take dive groups to the *Jacob Jones* and other wrecks in the vicinity. Visibility averages 15 to 30 feet. A diver who explored the *Jakie* asked Scheibel what the big deal was in diving a ship that is so blown to hell and back. Scheibel just smiled. Only an insatiable wreck diver who relishes the research and extols the heritage of the ships of the World Wars, can comprehend the thrill of such a dive.

In a book on our Navy's fighting ships,

A U.S. Navy diver prepares to dive on the *Jacob Jones*. The stern of the wreck is at least a mile inshore from the main section. Charter boats from Indian River Inlet, Delaware and Cape May, New Jersey now visit the ship, and visibility averages 15-30 feet.

Scheibel found a final footnote that fittingly closed the chapter on his diligent study: "On August 10, 1942 off Cape Ortigall, Spain, the U-578 was totally demolished as a result of a massive allied bombing attack. Captain E.A. Rehwinkel and his 49 crewmen were lost at sea . . . there were no survivors."

As this article was being typeset, *SKIN DIVER* learned that John Dudas had died on July 12, 1982, during a dive on an East Coast wreck. Dudas, of Westtown PA, was one of the first people to dive on the *Jacob Jones*. He is survived by his wife, Evelyn, and three children. Evelyn is the first woman to have dived on the *Andrea Doria*.

Scuba Quiz

Category: Seasickness

By Dennis Graver

There are many jokes about seasickness, and many people find humor in them—until they become ill. Motion sickness is no laughing matter. It can ruin wonderful dive opportunities. Since all divers eventually are exposed to motion producing situations, knowledge about seasickness and its prevention is valuable. Test yours with this month's quiz. The answers are on the following page.

1. Seasickness is caused primarily by:

- ☐ A. Visual and olfactory (sense of smell) stimulation
- ☐ B. Vestibular (sense of balance) stimulation
- ☐ C. Visual and vestibular stimulation
- ☐ D. None of the above
- ☐ E. All of the above

2. Select the least effective means to combat seasickness:

- ☐ A. Reading
- ☐ B. Sleeping
- ☐ C. Keeping busy
- ☐ D. Watching the horizon
- ☐ E. Eating lightly

3. Aboard a boat, the best location to be for thwarting seasickness is:

- ☐ A. On the bow
- ☐ B. On the stern
- ☐ C. Amidships
- ☐ D. On the bridge
- ☐ E. Below decks

4. When medication is used to prevent seasickness, it should be taken:

- ☐ A. An hour before exposure to stimulation
- ☐ B. At the first symptoms of illness
- ☐ C. Immediately after emptying the stomach
- ☐ D. The day before exposure to stimulation
- ☐ E. In doses proportional to the planned depth

5. Which of the following effects caused by seasickness medication should cause postponement of diving:

- ☐ A. Dry mouth and nasal passages
- ☐ B. Blurred vision
- ☐ C. Drowsiness
- ☐ D. All of the above
- ☐ E. None of the above

6. Divers tend to be more susceptible to seasickness:

- ☐ A. Aboard boats
- ☐ B. In the water
- ☐ C. Underwater
- ☐ D. Than the average person
- ☐ E. After diving

7. If nausea leads to vomiting on board a boat, the ill person should empty the stomach:

- ☐ A. Over the windward rail
- ☐ B. Over the lee rail
- ☐ C. In the head (rest room)
- ☐ D. At any convenient location
- ☐ E. As completely as possible

8. Which of the following foods should be avoided in order to reduce the chances of seasickness:

- ☐ A. Fats
- ☐ B. Carbohydrates
- ☐ C. Proteins
- ☐ D. All of the above
- ☐ E. None of the above

9. Select the true statement: Susceptibility to seasickness:

- ☐ A. Decreases with age
- ☐ B. Is greater in women than in men
- ☐ C. Decreases with experience
- ☐ D. All of the above
- ☐ E. None of the above

10. Which of the following statements is false:

- ☐ A. Drugs used to prevent seasickness can aggravate narcosis
- ☐ B. Seasickness reduces one's ability to recognize and cope with problems underwater
- ☐ C. If vomiting occurs underwater, it is best to throw up through the regulator
- ☐ D. Seasickness is contagious in that one person's illness can cause others to develop it
- ☐ E. About one-third of the general population is highly susceptible to seasickness

Scuba Quiz

Answers: Seasickness

1. C. Visual and vestibular stimulation. Motion generates signals to the brain through several senses—sight, stimulation of the vestibular organs (utricle, saccule and semi-circular canals in the ears), and through proprioceptor nerve endings that detect distortion in the skin and tendons. While the exact cause is unknown, it is believed that conflicting information to the brain from the various senses leads to the illness. The main conflict stems from what is seen compared to what is felt.

2. A. Reading. Based on the answer to question No. 1, it should be apparent that focusing visually on a nearby object while the rest of the world is in motion about you will increase one's susceptibility to seasickness. One effective means of combating motion sickness is to eliminate the visual stimulation. Closing the eyes helps, but sleeping is even better because it takes a person's mind off thoughts of illness.

3. C. Amidships. The extremes on a boat are the areas of greatest movement. While fresh air on the bow may help in one respect, the amplified motion may lead to illness. The ideal location is on the centerline of the boat at its mid point and as close to the water line as possible while still getting fresh air. Bracing the head in line with the back also seems to help.

4. A. An hour before exposure to stimulation. It is correct that medication should be tried in advance to determine if bothersome side effects are produced, but this test should be made well in advance of anticipated need. It is felt that taking seasickness medication a day in advance to adjust to the drug will reduce its effectiveness.

5. D. All of the above. Remember that the effects of drugs, especially combinations of drugs, under pressure are largely unknown and are often aggravated. Consult a diving physician for advice if medication is needed.

6. A. Aboard boats. Many divers know, or are encouraged, to get into the water if not feeling well owing to *mal de mer*. While it is true that some relief may be obtained underwater, divers must use discretion in deciding to dive when fighting seasickness. Vomiting underwater can be dangerous, and rushing to get underwater is unwise.

7. B. Over the lee rail. All boat divers should be familiar with nautical terms. Use of any rail is acceptable, but the lee rail is preferred because it is downwind. This location makes a person's plight less messy and less offensive to others on board. Throwing up in the head is a fine way to anger the crew, worsen your condition and cause others to get ill.

8. A. Fats. There are many theories about diets and seasickness. Some suggest a full stomach, while others recommend eating lightly. Crackers, hard candy, and other specific foods are frequently suggested. The best diet

is the one found to work through experience, but it is generally accepted that fatty and acidic foods should be avoided when making a boat trip. Light meals of proteins and carbohydrates are generally the most protective.

9. D. All of the above. Susceptibility to seasickness does decrease with age with one exception—babies don't seem to have problems at sea. It is comforting to know that we can adapt to motion and become more tolerant with increased experience on the water. Unfortunately it does seem that women are more susceptible than men, but this is probably owing to less experience with the conditions that produce the illness. This tendency should decline as more women gain experience in boat diving.

10. C. If vomiting occurs underwater, it is best to throw up through the regulator. Not so. First of all, don't stay underwater if you are so ill that vomiting is likely. But, if nausea is sudden and acute, be aware that throwing up through the regulator can clog it. Removal of the mouthpiece can lead to difficulties from involuntary gasping after throwing up. I suggest removing the regulator, but placing it at the corner of the mouth and keeping the purge button depressed to create a freeflow of air. In this way one can vomit and still get air. Thanks go to Harry Larigione, who shared this idea with me years ago.

It was difficult to deal with some of the unpleasant aspects of this topic, but I hope some things were learned that will make boat trips more pleasant for our readers. Those who scored well are probably those who are most affected by seasickness. If you did well on the quiz, but are not generally a sufferer, please share you knowledge with novices who are trying to find their sea legs. Let's make diving as enjoyable as possible for everyone.

Crisis Over Gun Control

ROBERT E. PETERSEN

Chairman of the Board, Petersen Publishing Co.

The crusaders are at it again. They're determined to tell us what to do and how to do it.

They're a dangerous group of ignorant and misguided fanatics who want to regulate our lives. They're starting "small," building a web of lies and deceit to disguise their real purpose—the ultimate confiscation of all firearms.

You know who they are. They are the same kind of "my rights before yours" group that have been trying to regulate everything we do or have from womb to tomb.

This time they call themselves Californians Against Street Crime and Concealed Weapons. They're out to freeze the number of handguns in California by requiring the law-abiding gun owner to register his handguns and by forbidding all new sales of handguns after April 30, 1983.

They're telling the public that this will reduce street crime. Utter nonsense!

But they've been successful so far, convincing nearly 600,000 California voters to sign their petitions so that their insidious initiative is now on the November ballot.

They're not telling the public the truth, but you don't have to tell the truth to be successful in politics.

This is what the California gun initiative really does.

Registration! The gun initiative requires that every handgun be registered with the California Department of Justice by November 2, 1983. All guns not registered by that time will be illegal in California—forever!

Confiscation! This gun initiative will immediately take away some of the handguns from law-abiding citizens! The initiative says that an individual can register only one handgun purchased between January 1, 1982 (retroactive by almost a year!) and April 30, 1983. So if you bought or buy more than one handgun this year or next year, Californians Against Street Crime and Concealed Weapons is going to take away all but

one. And, there is no provision for compensation or reimbursement either, you must turn it over to the police to be destroyed.

They've even planned for people who move to California in the future. Anyone moving to California after November 2, 1983 will have 45 days to turn over his/her handguns to the police.

Disarm! The proponents of the gun initiative say that it "is not designed to take handguns from a large volume of people." But that's exactly what it does. It virtually strips a majority of law-abiding citizens of their right to self-protection.

Figure it out. There are 17 million adults in California and an estimated four million handguns. A majority of the law-abiding citizens are never going to be able to own a handgun unless they're willing to break the law (a felony) and buy handguns on the black market that will be instantly created.

This initiative is just one more example of unwarranted government interference and intrusion upon the rights of law-abiding citizens.

Only a few years ago there was a similar movement to take the risk out of diving—by imposing bi-yearly recertification (at enormous expense to the diver) and mandating trained, paramedic-type personnel on every dive boat (at enormous expense of the outfitter). That bureaucratic blunder was rapidly and successfully attacked by divers and boat operators, and the do-gooders backed off. Now the emphasis is on handguns, but the war is the same—the war between individuals who prefer to take responsibility for their own safety, and legislators determined to protect us from all harm, no matter how much it harms us.

How naive can these people be?

No one fights crime effectively by going after the law-abiding citizens of society. No one fights crime effectively by confiscating the private property of those law-abiding citizens. No one fights crime effectively by disarming the law-abiding

citizen.

This initiative will actually impede the fight against street crime.

An analysis of the initiative by the California Department of Justice said that a bureaucracy of more than 800 people would be required to implement the initiative. "The result is that all operations of the Department from which individuals are recruited will be in a training mode. This will have an adverse impact on the Department's ability to process higher priority workloads, such as criminal fingerprints, in a timely manner."

The gun initiative will do nothing to stop crime and, by forcing the Department of Justice and local police to waste time regulating the activities of law-abiding citizens, hinders the work of law enforcement. It will take time away from fighting the criminal to concentrate on the law-abiding. That's not only terrible logic, it's stupid.

The Department of Justice will also be forced to maintain fingerprint cards on 1.6 million additional law-abiding citizens. "... this will increase the general fund cost and the time necessary for processing other workloads, including that related to criminal programs."

Senseless. Senseless. Senseless.

This dangerous and misguided initiative imposes a cruel hoax on the citizens of California by making them think that something is being done about the serious problem of crime. But this initiative does nothing to stop crime.

Something like this California gun initiative affects everyone everywhere. We can't afford to sit around while another valuable right is taken from us.

It can't happen in your state? The Citizens Against the Gun Initiative thought it couldn't happen in California!

Now, are you going to be one of the ones who sits around in November crying and moaning that "someone should have said something?" Or are you going to get out and contribute your time and money to defeat this initiative?



Zodiac's Mark II

A Classic That's Still Going Strong

TEXT AND PHOTOGRAPHY BY ERIC HANAUER

Most of the inflatable boats we have reviewed in these pages have been top of the line models, corresponding to the Jaguars or Mercedes of the automotive world. This month, we will look at the Zodiac Mark II—kind of a Volkswagen of the inflatable world. This does not mean, however that it's small and cheap, because it is neither. The Mark II is nearly 14 feet long and will easily handle four divers with full ocean gear. Like the VW, it has built up a large and enthusiastic following over many years. It also shares a significant production history with the Beetle. The VW was in production for 40 years with the design virtually un-

changed. More of them were made and sold than any other car in history. The Zodiac Mark II has been in production more than 35 years, with the basic design virtually unchanged. More of them have been sold than any other inflatable boat. In fact, according to Scott McIntosh of Port-a-Marine, Costa Mesa, CA, more Mark II's have been sold than any other manufacturer's total production of inflatable boats. As is the case with the Volks, there have been detail changes through the years. But, the overall length and beam, tube diameters and hull configuration are exactly the same as they were when the boat was first produced back in the

1940's.

"The Mark II is the optimum size," says McIntosh. "It can do everything: Ocean cruising, water skiing and diving. It has a high load capacity for its size. The hull configuration is what makes it work—a deep V, but not too deep."

Unlike the Volkswagen, the Mark II is not a small economy boat. (Of course, VW is no longer a small, economy car either.) Zodiac makes two smaller sportboats, and two that are larger, so the Mark II is right in the middle of the line. The reason for its popularity and longevity is probably that, at 13 feet, 10 inches, it is just the right size for a sportboat. It's

small enough to carry on top of a VW bus or, deflated, to store in an automobile trunk. At 165 pounds, folded in two separate bags, one person could carry it. Yet it will carry a payload of 1540 pounds. That translates to six persons, or four divers fully equipped. It will accept an outboard motor up to 55 horsepower but a 25 will do the job for most applications.

The Mark II is a very conventional looking boat, and with good reason. It has a lot of imitators, and is probably the most copied boat in the world as well as the best seller. There are a few changes for 1982, but you have to look hard to find them. The fixed bowdodger no longer has a plastic support bar underneath. McIntosh says that's because it wasn't really needed. As far as I know he's right, because it held my 180 pounds as I crawled across it. The oars have been moved outboard to provide more seating area. The end tubes are now black instead of the traditional gray. Although that makes the craft look smaller, it's the new trademark of Zodiac sportboats, so they all have it.

Perhaps the most significant change is the new bottom. It's made of a polymer material called Strongen. What's that? Plastic on a Zodiac boat? What's the world coming to? Next thing you know, they'll make compact Cadillacs. Not to worry. Strongen isn't an economy measure. As a matter of fact, it's an improvement over the material it replaced. Phil Cotton of Coast Inflatable Boat Repair, Costa Mesa, explained it this way. The bottom of an inflatable takes the most abuse, therefore its material must be strong and resistant to tears and abrasion. Most inflatable boats are coated on the outside with a neoprene/hypalon mixture. We all know about hypalon. It's the wonder material that is virtually impervious to ultraviolet rays, ozone, gasoline and oil and all the other things that rot rubber. The only problem is that hypalon weakens the neoprene it's mixed with. That's why nearly all inflatable boat manufacturers who use elastomers (rubber products) use neoprene without hypalon on the bottoms of their boats. That's fine, as long as the boat is stored in the water or in a garage. But what if the boat is stored upside down, as it would be if carried on a larger boat? The ultraviolet rays would eventually deteriorate the neoprene bottom.

That's where Strongen comes in. Not only is it resistant to breakdown by sunlight, it's also stronger than the neoprene it replaces. Strongen replaces neoprene on the bottoms of all Zodiac boats for 1982, from the dinghies to the Futura. Looking at it, I couldn't tell the difference.

The teardrop-shaped rubbing strake, a patented feature which deflects spray, is


also made of Strongen as of this year.

Other features which have made the Mark II the world's most popular inflatable boat are carried over into the current model year. It has Zodiac's exclusive interconnecting valves, which allow the three hull compartments to be filled from one valve. The smaller Zodiacs no longer offer this feature. The floorboards are a sandwich of European mahogany on the outside and polyurethane foam inside. That saves 20 pounds of weight over solid floorboards, and increases strength as well. The side stringers are aluminum.

Even the transom design exemplifies Zodiac's philosophy of strength with light weight. It's made of marine plywood, and looks thin compared to other inflatable boats' transoms. But, it's made up of 24 plies, each one angled 45 degrees from the adjacent one.

Standard equipment on the Mark II includes jointed oars, carrying bags, a pressure gauge, foot pump, a repair kit, and the Zodiac pennant. A diver's options would include carpeting to protect the floorboards, launching wheels, and perhaps a windshield or sun canopy.

All that is more affordable now because the price of the Mark II has dropped from \$3,000 to \$2,300. The Mark II is a better deal today than ever, with no compromises in quality.

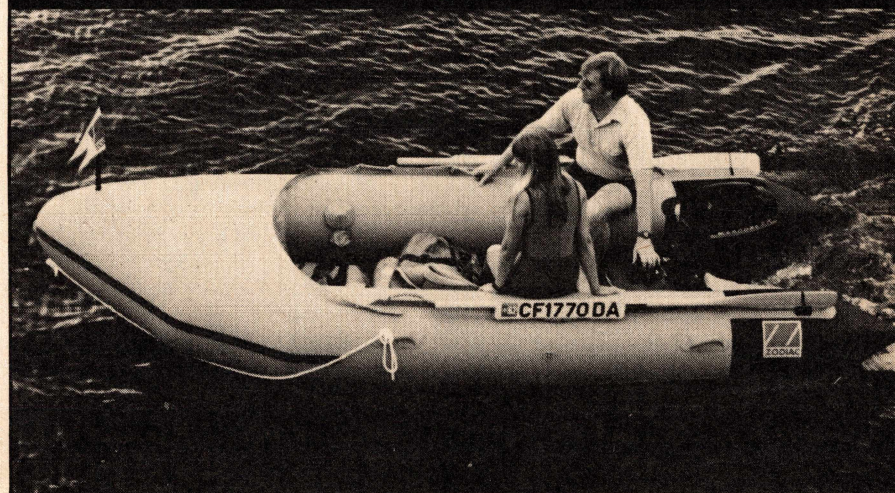
If a diver wants to take his savings up-market, the Mark II also comes in Grand Touring and Grand Raid version. The GT is red, with aluminum floorboards. The GR is the beefed up, military and pro version. But, the basic Mark II is all a diver can ask for in terms of portability, load capacity, and room. It might just be around for another 35 years. 



ZODIAC MARK II

Length	13'10"
Beam	5'6"
Interior length	7'
Interior width	2'6"
Tube diameter	18"
Weight	165 pounds
Number of compartments	3 plus keel
Maximum payload	1540 pounds
Capacity	6 persons, or 4 divers
Maximum horsepower	55
Recommended hp	25 to 40
Price	\$2,300

The Zodiac Mark II inflatable has been in production for more than 35 years and the basic design has remained virtually unchanged. One important new feature, however, is the bottom made of Strongen. This polymer is stronger than neoprene and more resistant to ultraviolet light. Other changes occur in the bowdodger and end tubes.





TEXT AND PHOTOGRAPHY BY GEORGE COZENS

One of the early pioneers in the manufacture of dive equipment, Waterlung has had a relatively long and distinguished history. In 1958 the company developed and patented the first single hose, two stage regulator. That same year it introduced the first submersible pressure gauge—called the Sea-View. This gauge later became the standard in dive safety, and for a number of years any SPG (regardless of brand name) was referred to as a Sea-View. Waterlung designed the first tank valve specifically for scuba diving and, in 1961, developed the first J reserve regulator. Many years later (in 1972) Waterlung was one of the first equipment manufacturers to promote the octopus regulator.

In those early years the Waterlung line of dive equipment was marketed with a number of other sporting goods the company manufactured. Gradually, Waterlung was superseded by Sportsways, a name more descriptive of the overall product line. In recent years, however, the company has returned to Waterlung (with a logo consisting of three dolphins

jumping over the letter W), as a means of emphasizing its relationship with, and commitment to, watersports.

An example of that commitment, and the newest addition to the current line of Waterlung regulators, is the Waterlung 250, called the "Breather." The manufacturer describes it as a "back to basics" unit. It certainly is that. The W-250 has been made with an eye on simplicity and economy. Although it is the least expensive regulator made by Waterlung, its low price should not imply cheap materials or construction.

The first stage has a simple (and conventional), balanced, flow-through piston design, contained in a heavy duty, chrome plated brass housing. The piston is made of stainless steel and has a special Teflon "wiper" that helps protect its O-ring from foreign matter. The high pressure seat, is a special polymer and is replaceable. These features are not new, however. They have been used in Waterlung designs for years. The W-250 has one high pressure port and four low pressure ports. The high pressure port on

models made since last summer has been changed to the larger 7/16 inch-20 thread size. This was done as a safety precaution, to prevent the accidental attachment of low pressure accessories. These later model regulators are shipped with an adapter so that SPG's with the smaller 3/8 inch-24 thread can still be used. These units have a high strength, forged brass yoke, capable of withstanding supply pressures up to 4000 psi—an optional DIN adapter is available for use with European tanks.

Even though the Waterlung 250 is the economy model, so to speak, the second stage is identical to that used with the other, more expensive models—in fact, the #932 second stage is used on all Waterlung regulators. The case is molded of a special space-age resin, which is corrosion proof, has high impact strength, and resists heat and cold distortion. The inside is shaped to minimize internal air turbulence and creates a venturi effect which reduces inhalation effort. Waterlung has been making second stage cases of resin for over a decade and

about the only change in that period was to switch to a somewhat stronger compound about four years ago.

The second stage utilizes a downstream valve design, which incorporates an exclusive and patented Waterlung feature, called a "floating piston orifice." It really is a clever device. A conventional downstream valve consists, basically, of an orifice (i.e., the valve opening, or outlet) and a valve seat (generally a pad of plastic, like Teflon). Typically, the orifice is stationary, and the valve seat moves: being pressed against the orifice by a spring, to close off the air; or being pulled away from the orifice by the demand lever to open the valve to air flow. An advantage of the downstream valve design is that excessively high intermediate air pressure will overcome the closing force of the spring, open the valve and vent off the excess. A disadvantage, however, is deformation of the valve seat, caused by the spring constantly forcing the seat into the orifice, especially when the air is turned off. When the seat gets deformed, or grooved, the adjustment of the second stage changes, affecting inhalation effort.

Enter the "floating piston orifice." In Waterlung's design, the orifice is not stationary—instead, it is allowed to float slightly. Acting like a miniature flow-through piston, the orifice is pushed up against the seat when air is turned on, but can retreat a little when the air is turned off, relieving the damaging contact between the orifice and the seat. Some manufacturers supply a tab, or key, which

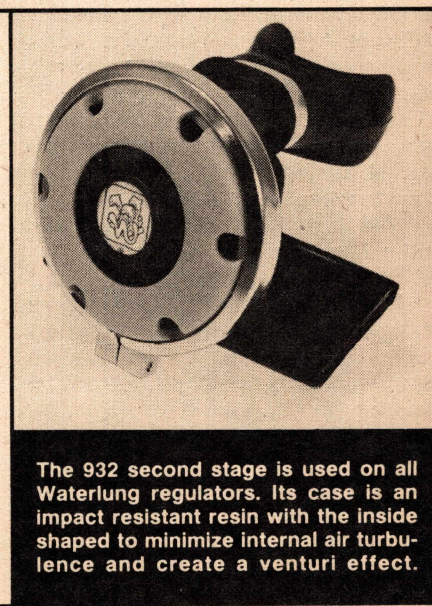
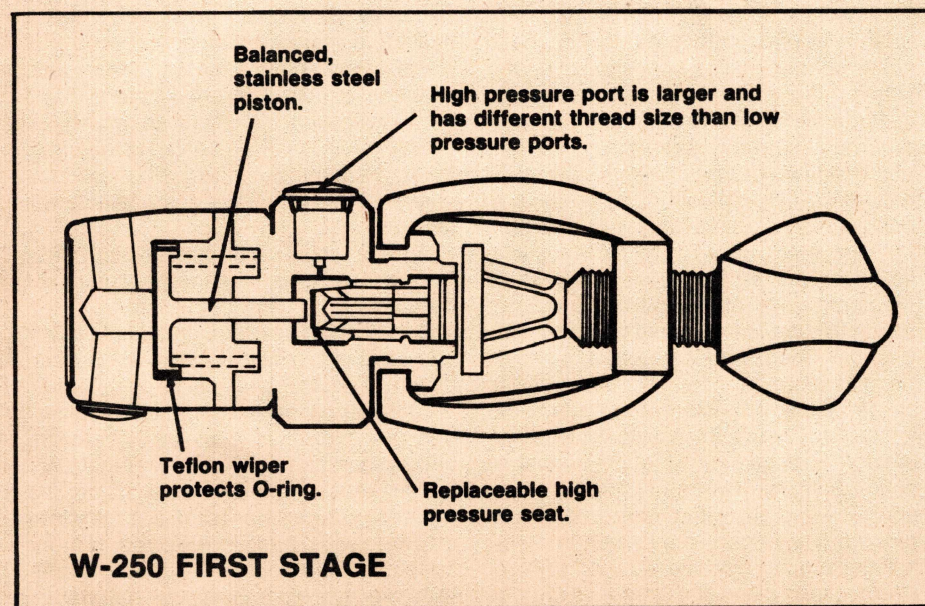
can be used during storage to depress the purge, opening the valve, and pulling the seat back from the orifice. These tools are helpful in maintaining the fine tuning of the regulator, and should be used. But, with the "floating piston orifice," deformation of the seat is reduced automatically whenever the regulator is not in use.

An "anti-friction insert," is included in the second stage. This is actually a nylon pad on the end of the demand lever, which reduces friction where the lever makes contact with the back of the diaphragm. A large (1.25 inch diameter) exhaust valve and big ports in the exhaust tee decrease exhalation effort. The exhaust valve, and diaphragm are made of an environmentally resistant, rubber compound. And, neoprene rubber diaphragm/purge covers allow easy purging; simplify after-dive cleaning; and eliminate purge button fouling (e.g., when sand gets caught between the purge button and a rigid cover, causing the purge to jam open).


In my evaluation of the Waterlung 250, I found the regulator performed as well as I would expect any good, conventional regulator to operate—no surprises, and no idiosyncrasies. In various positions and for different breathing rates the W-250 delivered air with reasonably little inhalation effort and relatively minor exhalation effort. Inhalation resistance increased when lying on my back (looking up), and when ascending (looking up), but this would be expected from any sin-

gle hose regulator—it's simply a matter of physics. In no position did I detect any water entering the second stage—a nice feature for abalone, or lobster divers, or other underwater contortionists. Although most of the exhaust bubbles ascended to the sides of my mask, some passed through the central field of view when looking horizontally, and down to about 45 degrees—but from there downward, no bubbles ascended in sight. Freeflow characteristics did not seem unusual. When the second stage was flooded, and held out in the water, it would not freeflow, regardless of orientation, unless purged (with the mouthpiece facing up), or if the unit was rotated very quickly, ending with the mouthpiece pointing up. With the second stage full of air, freeflowing would start more easily, but the mouthpiece had to point upward. In all cases, once freeflowing had started, it would not stop by itself, the mouthpiece had to be pointed down.

Unfortunately, I was not able to test the regulator under deep diving conditions, so I can't pass judgement there. But, from my brief experience with the Waterlung 250, and in light of its basic design, strong construction, easy maintenance, and very attractive price, I would recommend it for consideration in any general, sport diving application. The W-250 sells for \$148.50; with octopus and SPG it costs \$270.50. For more information contact: Waterlung, P.O. Box 2407, Huntington Park, CA 90255.



BATTERY GUIDE



PART II: For Underwater Strobes and 35mm Cameras

BY JIM AND CATHY CHURCH

In the August, 1982 SDM, Jim and Cathy Church examined and explained the many types of batteries available today. In this article they tell you how to choose batteries for your submersible strobes and give you helpful hints on using them. Also included are camera and strobe battery guides—the Editors.

If your strobe uses AA or C cells, the choice is really between alkaline and ni-cad cells. Carbon-zinc cells aren't designed for such severe use.

Follow these guidelines when making your choice:

1. If you are diving almost every weekend, the long-term economy of ni-cads is hard to beat. But if you only dive a few times a year, alkalines will be a more reliable, less expensive power source.

2. Aboard boats, or at remote locations where recharging might be difficult or impossible, a handful of alkaline cells might be worth their weight in gold—especially if offered to an U/W photographer with dead ni-cads.

3. Because ni-cads maintain their voltage during use, your recycle time will be shorter and won't lengthen as the battery is used. But because the ni-cads die quickly—without a lengthening recycle time as a warning—you have no indication of how much battery life remains.

4. Ni-cads deliver about one-half to two-thirds the flashes you get with fresh alkalines. So, be aware of battery capacity before making an expensive investment.

5. Although this problem occurs less with the newer strobes, ni-cads could damage your strobe. Because ni-cads give a faster recycle time, more electricity

is pumped through the circuits in less time and this generates heat. Also, because a shorter recycle time allows you to flash the strobe at a faster rate, additional heat builds up in the flashtube as well. Some strobe manufacturers specify that ni-cads are not to be used in place of alkaline cells; some openly state that they can be used; others recommend alkalines and ignore ni-cads in their manuals. We've used ni-cads in almost every submersible strobe on the U.S. market (those using AA or C cells), and haven't had problems—yet.

USING NI-CAD BATTERIES

Ni-cad cells, as well as removable or built-in ni-cad battery packs, do have some characteristics you should understand:

1. If a ni-cad hasn't been used for several months, it may need to be charged and used two or three times before it will deliver its full capacity. One method of conditioning a new ni-cad is to charge it up, and then run it down slowly with a flashlight until the light dims. Don't leave the light turned on after it burns out because this could damage the battery. The third time the ni-cad is charged, it should be at its peak. You can also turn a strobe on and allow it to idle in the on position for several hours as you discharge the battery. This gives the added benefit of conditioning the storage capacitor of the strobe. If you are using your dive light to run down a ni-cad, remember that you are consuming bulb life. And, to prevent overheating, place the light in a pan of cool water.

2. Ni-cads self-discharge more rapidly in high-temperature, high-humidity condi-

tions. Thus, if you are in the tropics, don't depend on the charge you gave your cell several weeks ago.

3. Ni-cads may develop a memory for underuse. For example, assume that a ni-cad is supposed to power 80 strobe flashes, with a one-hour recharge time. In actual use, however, you normally flash the strobe 36 times and then charge it for a half hour. This conditions the ni-cad to resist giving the full 80 flashes in the future. To break the memory, the cell should be fully discharged (until it fails to recycle the strobe, or the light dims, but without excessive discharging) and recharged two or three times. Note: Eveready states that their testing doesn't indicate a memory problem.

4. Charge and use ni-cad cells in sets. If you have more than one set, label them for identification. If the cells are mixed up, give them all a full charge to equalize them. Remember, if just one cell discharges before the others, the battery will fail.

5. Don't mix ni-cad with alkaline cells because the lower-voltage ni-cads could be damaged.

6. Keep the cell terminals and battery compartment contacts clean to get the full power out of your cells.

7. Because batteries generate hydrogen gas (which is explosive), vent the battery compartment after a day's use. We've seen two explosions inside the battery compartments of submersible strobes with built-in ni-cads. These strobes should contain a catalyst to prevent the hydrogen build-up, but we always play it safe by leaving the charge cap off for 15 minutes after charging and at the end of each day's use.

EVEREADY BATTERY GUIDE FOR CAMERAS

AMPHIBIOUS CAMERAS & EXPOSURE METERS		
Dacor DLM exposure meter	1	EPX13 or EPX625
Eumig Nautica Super-8	2	E91
Hanimex Amphibian 110	2	E91
Minolta Weathermatic-A 110	1	E91
Nikonos IV-A (35mm)	2	EPX76 or A 76
Sea & Sea Pocket Marine 110	2	E91
Sekonic Marine Meter	1	EPX13 or EPX625
CANON 35MM CAMERAS		
A-1, AE-1, AE-2P, AV-1	1	544 or A544
AT-1	1	544
F-1, FTB TX, TLB, EX	1	EPX625 or EPX13
EF	2	EPX625 or EPX13
GIII-17, CANONET 28, A35F	1	EPX625 or EPX13
	1	EPX625 or EPX13
	1	ni-cad
Datematic, Canodate E	2	EPX640
CANON MOTOR DRIVES		
F1 AE & MA (new)	12	E91
MD & ME	10	E91
COSINA 35MM CAMERAS		
CX-2 (for U/W housing)	2	EPX76 or A76
Auto winder for CX-2	2	E91
CX-LS topside strobe for CX-2	1	E91
FUJICA 35MM & SINGLE-8 CAMERAS		
GE & GER	2	EPX640
GL640 & GL390	1	544 or A544
ST601 & ST701	2	E400N
ST605, ST605N, ST705 & ST705W	2	EPX76 or A76
ST801 & ST901	1	544 or A544
STX-1, HS-1	2	EPX76 or A76
AZ-1	3	EPX76 or A76
AX-1, AX-3, AX-5	1	544 or A544
P2 Single-8 Movie w/P2 casing	2	E91
KODAK 110 CAMERAS		
Ektralite 10, Ektramax	2	E91
Teli-Ektralite 20, 30 & 40	2	E91
Pocket 30, 40, 50 & 60	1	538
Trimlite 28, 38, & 48	1	538
Ektralite 500 & 600	1	522 or 1222

KODAK 126 CAMERAS		
Inst. 100, 194, 150 & 154	2	E92 AAA
Inst. 124, 134, & 174	2	EPX825
Inst. X35, X45, X90 & X-35F	1	EPX30
KONICA 35MM CAMERAS		
C35AF & C35EFD, AF, AF2, EFP	2	E91
C35 & 35, C35V	1	EPX675
EF, EFN	1	EPX675 & 2 E91
	1	AA's
FC-1	4	EPX76 or A76
MAMIYA 35MM CAMERAS		
1000DTL, 528TL, 528AL	1	EPX76 or A76
Auto XTL, Auto X1000	1	EPX76 or A76
NC1000 & NC1000S, XE-X	2	EPX76 or A76
ZE, ZE-2	4	EPX76 or A76
135EF, 135AF	2	E91
MINOLTA 35MM CAMERAS		
XD5, XD11, XK, CLE	2	EPX76 or A76
Motor drive for XK	10	E91
Auto winder for D & XD	4	E91
XE5, XE7, XG1, XG7, XGM	2	EPX76 or A76
Auto winder for G, XG	4	E91
Motor drive 1 for XGM	8	E91
SR-T 200, 201 & 202	1	EPX625 or EPX13
HiMatic C, G, G2 & 7S II	1	EPX675
HiMatic E, F, & FP	2	E640
HiMatic 7 & 7S	1	EPX625 or EPX13
HiMatic S, SD, S2, AF & AF2	2	E91
MINOLTA 110 CAMERAS		
Autopak 50, 70, 250 & 270	1	538
Autopak 430E, 440E & 450E	2	E91
Autopak 200 & 600X	1	E640
Autopak 439EX, 450EX & 460EX	1	E91
NIKON 35MM CAMERAS		
Nikonos IV-A U/W camera	2	EPX76 or A76
F2, F2SB, F2A, F2AS, F3	2	EPX76 or A76
FM, FE, EM	2	EPX76 or A76
F Photomic Finder	1	EPX13 or EPX625
T, TN, FTN Photomic Finders	2	EPX13 or EPX625
Nikkormat FT, FTN	1	EPX13 or EPX625
Nikkormat EL, ELW, Nikon EL2	1	544 or A544
Nikkormat FT2, FT3	1	EPX76 or A76

MD2, MD4, MD11, MD 12	8	E91
F250, F36 w/std. pack	10	E91 or CH15
MD E, for EM camera	6	E91
AW1 auto winder for EL2	6	E91
OLYMPUS 35MM CAMERAS		
OM-1, OM-1N	1	EPX625 or EPX13
OM-2, OM-2N	2	EPX76
OM-10, XA, XA-2	2	EPX76 or A76
35, RC, RD, 35EC2, 35ECR, Pen FT	1	EPX625 or EPX13
	1	EPX625 or EPX13
PENTAX 35MM CAMERAS		
SP, SP11, SP11A, SP500, SP1000	1	E400N
SPF	1	EPX625 or EPX13
ES	1	544 or A544
ESII	4	EPX76 or A76
KX, ME, MESE, ME Super	2	EPX76 or A76
KM, K1000, K1000SE	1	EPX76 or A76
MVm NV-1, K2, K2DMD, LX, MX	2	EPX76 or A76
LX Autowinder	4	E91
ME Powerwinder	6	E91
MX & MEII Powerwinders	4	E91
Motor drive MD & MDII	8	E91
RICOH 35mm CAMERAS		
Ricoh AD1 & 2A	2	EPX76
VIVITAR 110 CAMERAS		
Vivitar 406	1	544
all others	2	E91
YASHICA 35MM CAMERAS		
TL Super, TL	1	EPX76 or A76
TLE, TLE Electro	2	EPX640
TL Electro-X	1	544 or A544
Electro-AX	1	E164
Minister D, Lynx 5000	1	EPX13 or EPX625
Lynx 5000E	2	EPX650
Lynx 14E	1	EPX13 or EPX625
Electro 35FC, 35, 35G, 35GS	1	E164
35GSN, 35GT		
Electro GL, Electro 35MC	1	544 or A544
35me, ME-1, FX2	1	EPX675
Powerwinder (FR cameras)	6	E91 or CH15
FX3, FX-D	2	EPX76 or A76

USING DISPOSABLE BATTERIES

To maximize life for disposable cells and batteries, follow these guidelines:

1. Store cells and batteries in a cool place. For extended storage, place them inside a plastic bag, tightly wrapped to minimize airspace, then place the bag in a refrigerator or freezer. And, before use, allow the bag to warm up to room temperature before opening it. This prevents voltage loss through the condensation on the cells.

2. With a strobe or dive light, alternate batteries on a day-by-day basis. A day's rest allows a battery to regain some lost voltage. This is more noticeable with carbon-zinc cells.

3. Label 300 v and 510 v batteries, and make a tally mark on the battery or battery package, for each 36 flashes it powered, to keep track of its usage.

4. Replace all the cells in a battery at one time. Replacing a partial set, or mixing cells of different quality, could cause the lower-capacity cells to over-discharge and leak.

5. Clean the cell terminals and battery compartment. A pencil eraser is a good tool. Don't, however, attempt to clean the terminals of a 300 v or 510 v battery as you could receive a serious shock.

6. If you haven't used a strobe for several months, the strobe storage capacitor will resist taking a charge at first. If you use alkaline cells or a carbon-zinc high-voltage battery, use a set of old cells or battery to condition (form) the capacitor. Turn the strobe on, flash it several times and then let it idle in the on position for an hour. Remove the old cells or battery, insert the new one(s), and the strobe is ready for use.

The chart above lists the number and type of Eveready batteries required to operate today's cameras, light meters and power winders. The chart below gives the same information for submersible strobes plus the total flashes provided.

SUBMERSIBLE STROBE BATTERY REPLACEMENT CHART

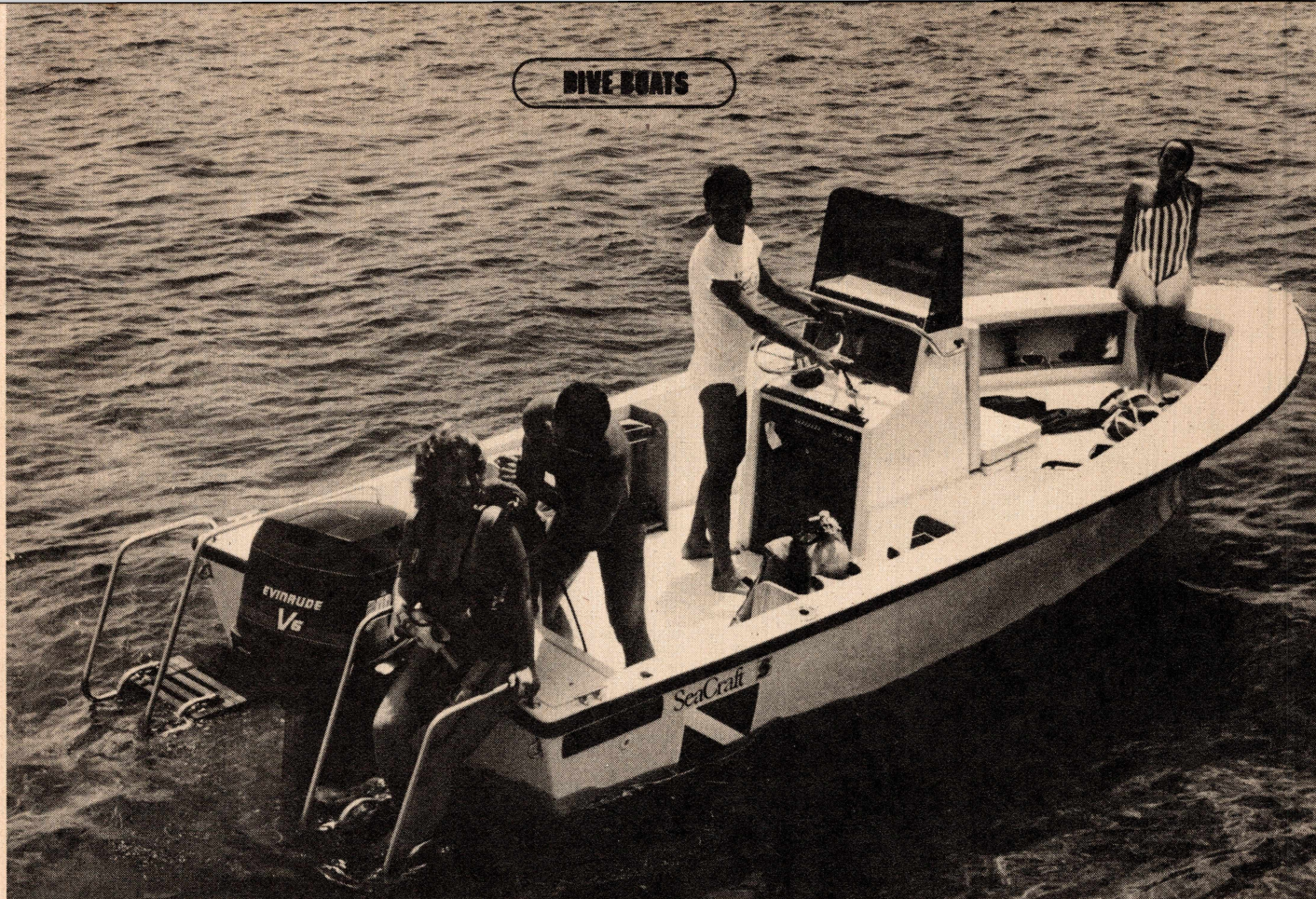
MANUFACTURER OR U.S. DISTRIBUTOR	NUMBER OF FLASHES	BATTERY REQUIRED	EVEREADY NUMBER
AQUA-CRAFT			
Novatek II & III	350	2 C alk.	E93**
BERKEY MARKETING COMPANIES			
Sunpak Marine 28 (discontinued)	50-60	6 AA alk.	E91*
Sunpak Marine 32	150/80	6 AA alk.	E91*
ELMO MFG. CORP.			
Toshiba TM-1 (discontinued)	200	4 AA alk.	E91***
Toshiba TM-2	130	4 AA alk.	E91*
FARALLON/OCEANIC			
OS-2000, OS-2000S	300+	2 C alk.	E93**
HELIX			
Aquaflash 22	110+	6 AA alk.	E91*
Formaplex Strobe	N/A	4 AA alk.	E91
Ricoh Marine Flash	150+	4 AA alk.	E91
IKELITE			
SST systems	N/A	1 22.5v, or	505
(AA option, 1981 or later units)		1 AA alk.	E91
Substrobe M and MS	200+	4 AA alk.	E91*
KRITTER LABS			
Light Handle	100	8 AA ni-cad	CH15
MINOLTA			
Weathermatic-A (built-in strobe)	180	1 AA alk.	E91***
NIKON			
Flashbulb unit, Nikonos I & II	N/A	1 22.5v	412
Flashbulb unit, Nikonos III	N/A	2 15v	504
SB-101 Speedlight	150	8 AA alk.	E91**
COSINA AMERICA, INC.			
Cosina Seamaster ST & DX	160	4 AA alk.	E91**
SEA & SEA, U.S.A.			
Yellow-Sub 20	250	2 AA alk.	E91**
Yellow-Sub 50 & 50M	250	4 AA alk.	E91**
SUBSEA PRODUCTS			
Mark 25 (discontinued)	300	2 C alk.	E93**
Mark 30	450+	3 C alk.	E93*
Mark 100	1500	1 300v	493****
Mark 150	1500	1 510v	497****

*Manufacturer's instructions include ni-cad substitution.

**Ni-cads not mentioned in manual, but we have used them.

***Manufacturer warns against using ni-cads.

****Only high-voltage, carbon-zinc batteries are available.



SeaCraft's Sport Diver 20

Divers are a unique breed. They will go to great lengths and even greater expense to immerse themselves in the depths of the ocean in far away paradise resorts. Yet, when it comes to getting to and from favorite local diving spots they hate to get wet! Boat manufacturers work tirelessly trying to produce just the right combinations in their hull designs to keep divers dry, but few have achieved better results than SeaCraft.

The design engineers at SeaCraft have had over 20 years of experience in producing world class outboard racing hulls. Their hull design is so unique that they have a U.S. patent on it. Quite an accomplishment when you realize that the bottoms of all boats are basically the same with the exception of angle of the V. SeaCraft calls its unique design the "VDH," or Variable Deadrise Hull. Since it is protected by a patent, you cannot purchase a similar design from any other manufacturer.

What makes this design so unusual and the ride so dry? If you look at the bottom of the Sport Diver 20 you will quickly see three separate "steps." These resemble a very flattened upside down staircase with the steps only rising about one inch each. The angle of each is

slightly different, producing a hull with a variable V design. When the boat is in motion the steps create air pockets which produce less friction with the water. Less friction produces faster planing speed, greater fuel economy and a smoother, softer ride in any type of sea condition. According to company tests the VDH also greatly contributes to the directional control of the boat. The boat is less likely to roll and is structurally capable of working in very adverse seas. A favorite slogan in company literature is "The only thing that gets wet...in a SeaCraft is the bottom of the hull!"

When we visited the SeaCraft factory in Tampa, Florida it also became apparent that these people take very great pride in the boats they build. For example, each craftsman must sign a log showing who did what work on each hull. This log follows the boat throughout its entire trip through the construction phases and becomes a part of its permanent warranty record.

The boat is constructed of fiberglass and is entirely laid up by hand. The length of the transom is laminated together with multiple layers of fiberglass reinforcing. Many designs only reinforce the outboard motor mounts, but not SeaCraft. In addition

to this reinforcing, the fiberglass stringers of the boat are filled with foam floatation. The total reinforcement eliminates the flex often found in less expensive hull designs and makes for a more comfortable ride.

In basic appearance the boat is quite clean. There are no swivel seats, built-in ice chests (you can ask for this if you choose, as an option), or other large obstacles in the staging area of the boat. There is plenty of space. Even the center console is scaled down. The idea is to give the diver plenty of room for bulky pieces of equipment and minimize unnecessary accessories. Storage space has been amply provided in two forward lockers below deck (one doubles as a livewell) and one locker aft. Gear that needs better protection, such as cameras, can be stored inside the lockable console. This has teak doors and is carpeted to absorb vibration.

Two outstanding features of the hull's design are the ladders connected to the dive platforms and the stainless steel grab rails along the side. These allow extremely easy exit from the water. If you have ever experienced difficulty lifting both your weight and that of your gear from that last step onto the dive platform

SPORT DIVER 20

Length	20'4"
Width	7'6"
Weight	1700 lbs.
Max. hp (outboard)	175
Fuel Capacity	70 gal.
Price (w/o engine)	\$12,000

you shouldn't here. The grab rails along the side of the boat are right at the water line and make holding yourself in position while waiting to exit a snap. These designs were obviously created by divers, not engineers who have never had tanks on their backs.

With an overall length of 20'4" and a beam of 7'6" the Sport Diver has plenty of room but is small enough to use more economical outboard motors. The maximum power the boat can accommo-



The Sport Diver 20 has room for storage with two lockers in the forward deck (one doubles as a livewell) and one in the rear deck. The boat is designed to maximize open deck space.

date is 175 hp. The built-in fuel tank has a 70 gallon capacity. This provides a considerable amount of running time. Standard features of the Sport Diver 20 include a self-bailing cockpit, molded battery boxes, bilge pump, tinted plexiglass

windshield, stainless steel steering wheel and teak tank racks large enough to hold eight tanks.

Options include speargun (rod) racks, Bimini top, spray hood, radio box, complete instrumentation and accessory navigational equipment. For special needs there is a lengthy list of options.

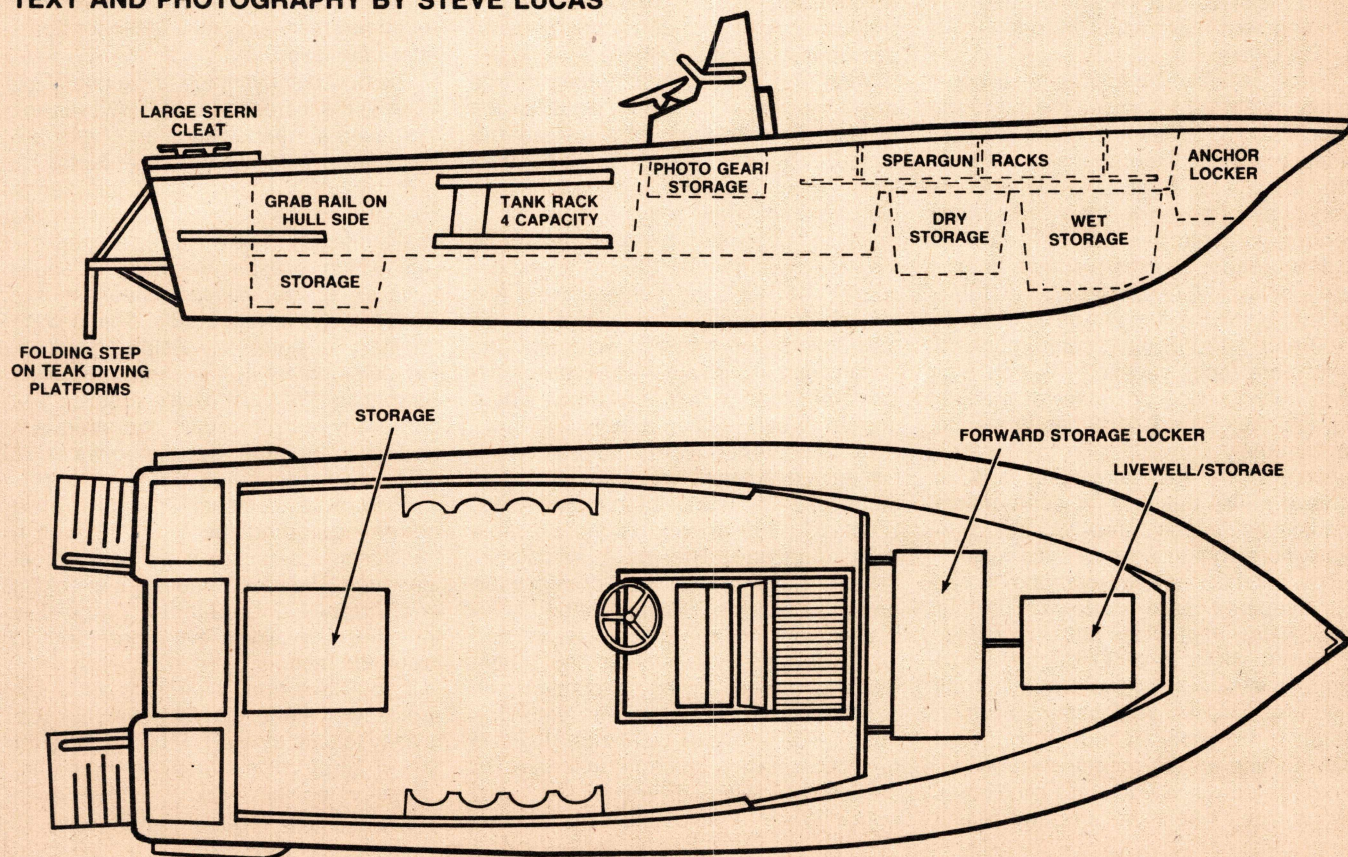
For the SKIN DIVER test run we used a boat from Key West Oceanside Marina in the lower Florida Keys. The day was flat calm and it was difficult to get an idea of how well the boat would handle in rough water until our skipper decided to chase through the wake of a shrimp boat in lieu of rough seas. The VDH does everything the manufacturer says it will and the boat rates extremely high in all regards. With dive gear loaned us by Key West Pro Dive we put the boat to the real test and took it diving. This one is tough to beat!

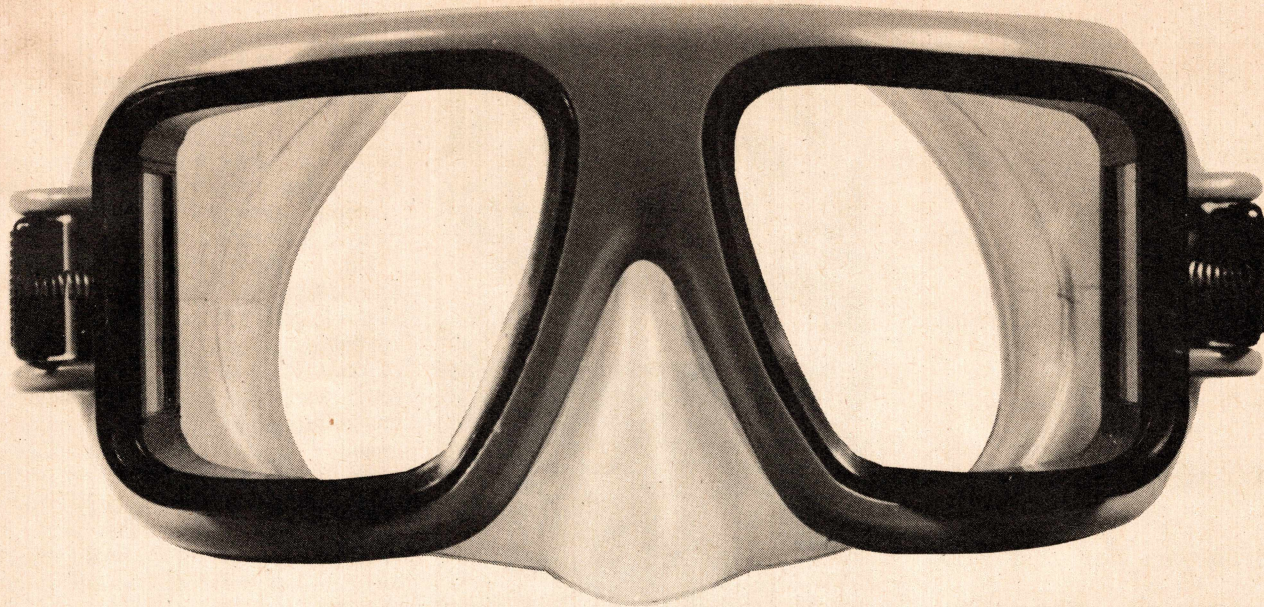
The people at SeaCraft admit that they don't build a boat for the average boater: They aim for the discriminating, demanding, experienced boat owner. The Sport Diver 20 is obviously not designed for everyone—as her \$12,000 base price (without motor or trailer) will attest.

SeaCraft boats can be found at select dealers throughout the country. For the name of one near you contact: SeaCraft Industries, Inc., P.O. Box 19245, Tampa, FL 33686; telephone (813) 837-0340 - 0382.

Exclusively Designed For Discriminating Divers

TEXT AND PHOTOGRAPHY BY STEVE LUCAS





TEKNA T-1100S

Silicone Version of a Wraparound Favorite

TEXT AND PHOTOGRAPHY BY MARTY SNYDERMAN

Since 1976 the Tekna T-1100 has been one of the most popular masks on the market. It seemed as if everywhere I went, the Coral Sea, the Red Sea, Baja, Southern California, etc., somebody was giving a heartfelt testimonial about his/her Tekna mask. After hearing so much talk about the T-1100, I decided to give one a closer look. In doing so I learned that the streamlined design and near universal fit were the keys to its success.

Tekna recently introduced a silicone version of the T-1100 called the T-1100S. It is identical to the original mask with two exceptions. First, the rubber skirt of the T-1100S is clear, surgical grade silicone rubber, as opposed to black neoprene. Second, the flanges on the seal are slightly broader and more supple to provide a better fit for more faces. For 1982, the molds for the flanges of both the T-1100 and T-1100S have been improved to fit more facial varieties. As Lou Slocum, Tekna's vice president of marketing, told me, "The T-1100 has proven to be extremely popular. With the silicone version, all we are really trying to do is achieve a little better fit for some divers and take advantage of new technology to allow more light to penetrate the mask."

The T-1100S is a wraparound. It has four tempered glass windows. The four window design provides added peripheral vision. There is a 90 degree angle where the side windows join the front windows. This eliminates the distortion which is inherent in multi-windowed masks using angles greater than 90 degrees. There will still be small blind spots on the sides where the windows fit into

the frame. But, the added window area allows you a wider field of view.

The T-1100S is lightweight and extremely low profile, especially considering the four window design. According to Slocum, "The T-1100S is 30 percent lighter than any other wraparound mask found in today's marketplace." Out of water the mask weighs only 10½ ounces. Slocum added that, "The T-1100 series masks are also the lowest volume wraparounds currently available."

Volume is especially important to free divers who must constantly equalize the pressure inside their masks to avoid squeeze by using precious air from their lungs. Most wraparound masks have a high volume. They require more air to equalize, a considerable disadvantage to the free diver. The T-1100S is an exception to the rule. The comparatively low volume is a feature that should not be overlooked. The mask's low profile and streamlined design are also excellent features for those who dive in areas where current or surf is often a factor.

Silicone rubber offers a number of significant advantages when compared to the black neoprene used in most masks. Surgical grade silicone is more pliable than neoprene. The mask seals are, therefore, generally more comfortable and more reliable. Silicone rubber is virtually immune to sunlight, salt water, and aging caused by reversion (the breakdown of rubber owing to contact with ozone or chemicals such as chlorine). Thus, silicone masks last longer than do neoprene masks, given normal care. To prevent yellowing, divers should avoid bringing their silicone masks into contact

with black rubber or oil.


The clear quality of the rubber allows more light to penetrate the mask. And, photographers find it much easier to light the face and eyes of a model who is wearing a silicone mask.

A number of people are allergic to neoprene. Silicone rubber is hypoallergenic. That fact will help a lot of divers avoid the embarrassment and irritation of wearing bright red rashes on their faces for hours after their dives.

The only disadvantage to the use of silicone is the increased cost. However, the increased life expectancy and other advantages should outweigh that factor.

The T-1100S utilizes a double flange seal around the skirt to help ensure the seal's integrity. There is a split strap design which is especially easy to adjust because of the stainless steel, spring-loaded locks on each side. These were originally designed by Ralph Shamlian, the president of Tekna, and are called Strap-loks. With just a little practice you can easily learn to adjust the strap tension with one hand, even underwater.

The red and black frame of the T-1100S is an eye catcher. In August Tekna began equipping the T-1100S with a translucent, candy apple red polycarbonate frame. The new frame is good looking and virtually unbreakable. Since it is translucent, it allows even more light to reach the face.

If you have been searching for a low profile, well made, comfortable mask that is easy to use, try the T-1100S. It sells for \$69.95 at pro dive stores. For further information contact: Tekna, 3549 Haven Avenue, Menlo Park, CA 94025. 



TS-1000

18.3°C

Thermometer
The World's
First!!

CASIO'S NEW MARINE CHRONO HAS IT ALL

The 100 meter genius that
goes one step further than
all the rest.

Casio has created a marine watch in a class by itself. With every conceivable convenience. . . unmatched featherweight comfort. . . and rugged 330 feet water resistancy.

This underwater timekeeper makes even the fanciest marine watches seem ordinary. It not only provides you with an electronic thermometer, but gives you three alarms, 12/24 hour time, a full-function stopwatch and more.

Introducing the CASIO **TS-1000** chronograph. Under \$50.00 and only available through **ON THE RUN**.
A WORLD EXCLUSIVE - TEMPERATURE READOUT

CASIO engineers have gone one step further in their line of gifted marine digitals. They've built a 100-meter alarm chronograph that measures temperature (in Celsius or Fahrenheit) in or out of water.

Imagine a timepiece that tells you the temperature simultaneously with time or stopwatch. And allows you to set a thermo alarm to tell you when water or surroundings are too hot or too cold.

It's ideal for divers, swimmers, yachtsmen, fitness buffs or anybody who wants to know the temperature in an instant.

STOPWATCH, 8 TIME ZONES AND THREE ALARMS

The push of a button sets into motion a fiercely talented stopwatch. You get 1/100 of a second accuracy, lap time, and up to 59.99 seconds of racing time-keeping. Timing automatically repeats after the hour.

In addition to regular timekeeping (in 12 or 24 selectable format), you get 8 time zones: Tokyo, Honolulu, San Francisco, Chicago, New York, London, Paris and Moscow. This function is especially useful for travelers, domestic and foreign. Hours, minutes and seconds are displayed with reliable ± 15 seconds

a month quartz precision. In addition to a thermo-alarm, you also get a daily wake-up/appointment alarm and an hourly alarm. Of course, all can be silenced with a button. Press another button, day and date appear. And another for a built-in night light powered by a long-life lithium battery.

TWO STYLES AVAILABLE

The featherweight black polysulfone **TS-1000** is available for only **\$49.95**. So lightweight and comfortable you may never realize that you're wearing the most advanced underwater watch on the market today. For only **\$79.95**, you can get the all stainless steel model **TS-3000**.

Both are rugged and withstand water in any form — sweat, rain or total submersion.

TWO OTHER TOP CHOICES ANOTHER WORLD EXCLUSIVE - 200 METER DIGITAL

CASIO's Deep-Water Chronographs are the first and only 200 meter quartz digitals available anywhere. Working for you from over 660 feet deep, these watches have 12/24 hour time, a 7-year battery life, unique 12-digit display which allows you to see time in every mode, one-hour 1/100 second stopwatch with a repeat, countdown alarm, daily alarm, electronic calendar, time signal and night light. In the countdown alarm or stopwatch modes, a signal confirms a start and a signal sounds (even underwater) at 10 minute intervals.

The all stainless **DW280** is available for **\$69.95**. The stainless case and resin band **DW280C** is only **\$59.95**. And for just **\$34.95**, you can own the 100 meter water-tight black polysulfone **W-300**, the world's most asked-for underwater timepiece.

LADIES DEPTH-TESTED CHRONOGRAPH

Today's active female now has a watch that travels with her wherever she goes, land or sea. This trim watch features

deep-down quartz precision (335 feet) and a full-function 12-hour stopwatch. A 5-year lithium battery powers the distinct display — (hours/AM/PM/day/date/month). The all stainless case and band model **LW-800** is only **\$43.95**. Model **LW-800C** with stainless case and black plastic band is **\$38.95**.

OUR DOUBLE GUARANTEE

First, the included On the Run American warranty. One-year parts and labor (in the rare event repair is needed, you'll find this service by mail feature very convenient).

Secondly, we guarantee your satisfaction. If not delighted with your new CASIO, return it within 30 days for a full refund.

SPEEDY DELIVERY

We're proud of our prompt delivery. Being one of the largest CASIO timepiece dealers in the United States, we almost always have the watch you want in stock, and we generally ship the day we receive your order.

We're as close as your phone. Orders are accepted 24 hours a day, 7 days a week.

Order now and be delighted.



DW 280

LW-800

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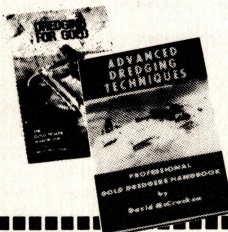
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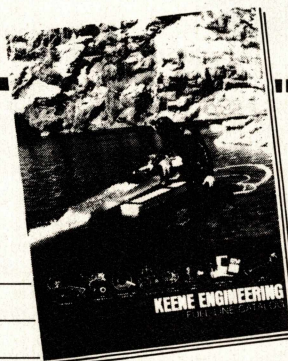


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For information write: Cousteau Society Festival, 21 Augusta St., Hamilton, Ontario L8N 1P6; or phone (416) 525-6644.

IQ-13 FEATURES WATERMAN

Sponsored by the NAUI Diving Association, the Thirteenth International Conference on Underwater Education (IQ-13) will be held at the Red Lion Inn in Ontario, CA Nov. 5-7. One of the highlights of the event will be a limited engagement film festival hosted by underwater filmmaker, Stan Waterman. Films will include *The Sea of Cortez*, *The last of the Right Whales* and Waterman's latest work, *Bonaire*.

For information contact the nearest NAUI branch manager or Sue or Ron Bangasser, 12724 Valley View Lane, Redlands, CA 92373; (714) 794-4495.

AAUS CONFERENCE

The American Academy of Underwater Sciences will hold its second annual conference on October 29-31 at Scripps Institution of Oceanography, La Jolla, CA.

Among others, presentations will include: The Wasp in Santa Barbara Channel—Dr. Alice Alldredge; The Use of Surface-Supplied Dive Equipment in Conducting Biological Surveys—Dr. Robert Given; Blue Water Diving and Other Scuba Operations Around the World—Dr. William Hamner; and *The Challenger Concept—Promises of the Future—Graham Hawks*.

A \$25 registration fee is required which provides admission to the conference and a copy of the program and abstracts of the presentations. For registration information contact: James R. Stewart, Scripps Institution of Oceanography, La Jolla, CA 92093; (714) 452-4445. Applications for membership in the AAUS can be obtained from: American Academy of Underwater Sciences, Membership Committee, 947 Newhall St., Costa Mesa, CA 92627; (714) 646-1601.

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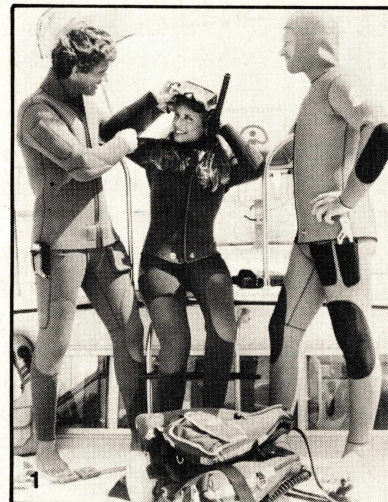


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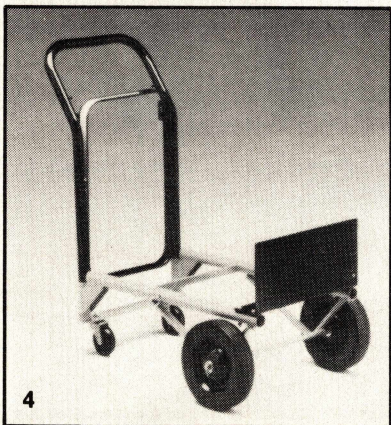


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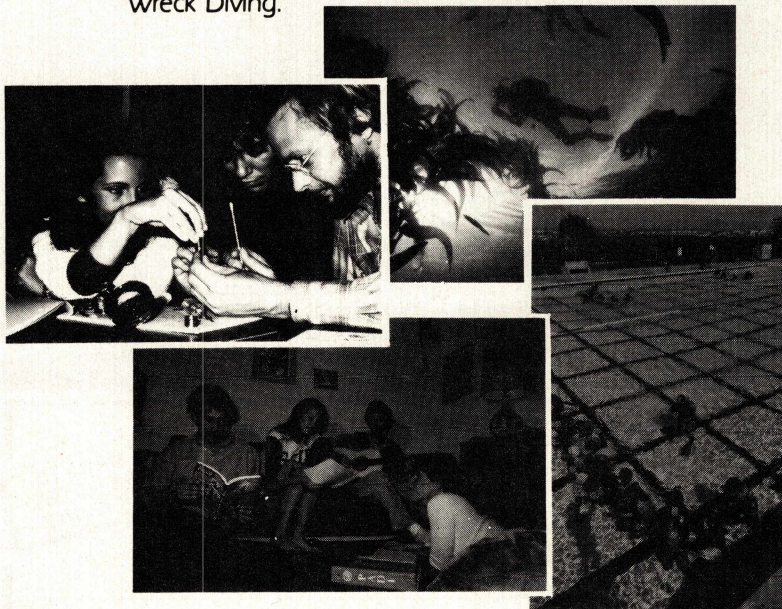
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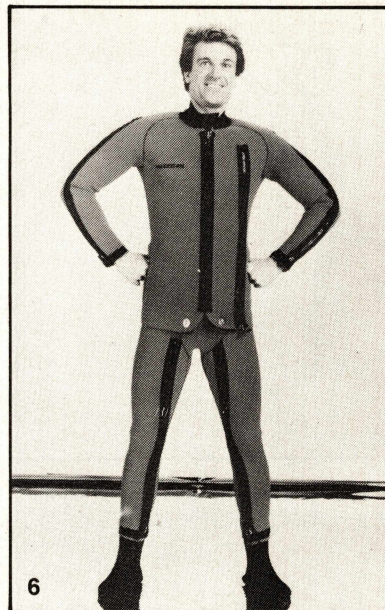
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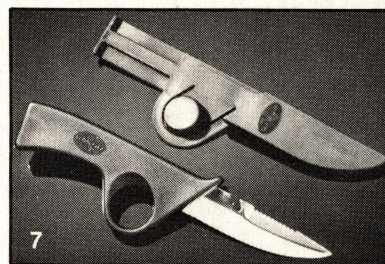
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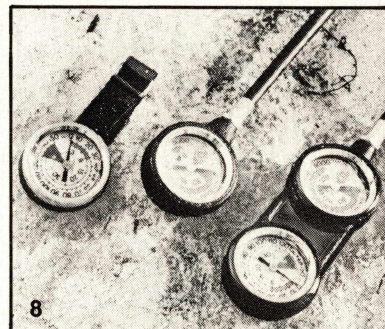
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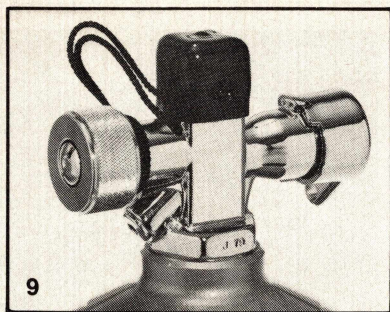


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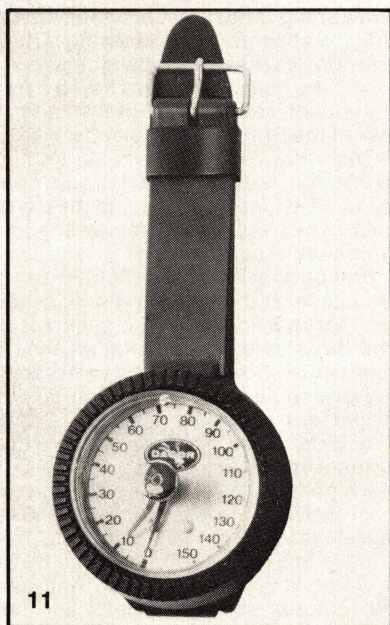
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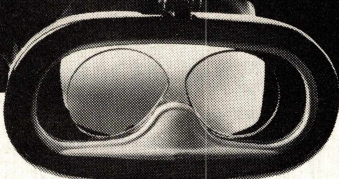
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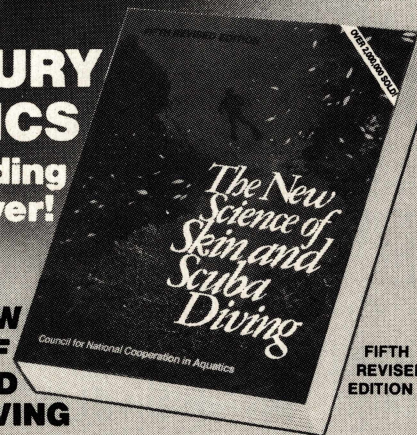


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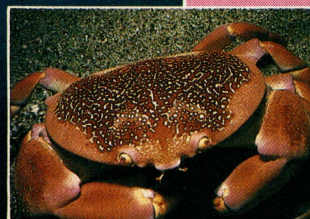
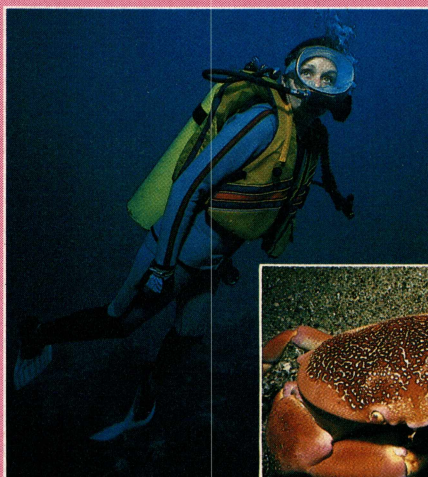
Wild Caribbean Drift Dive

Text and photography
by Bill Gleason

The beaches wander for miles: Serene, untouched, visited only by the gentle lapping of waves and the occasional tropic bird. Some people say Daniel Defoe used the island of Tobago (To-Bay-Go) for the setting of his novel, *Robinson Crusoe*. Defoe apparently visited the island before he wrote the classic in 1719. It's easy to understand why. Even today, over two and one-half centuries later, the island is still paradise. Constant temperatures in the 80's are moderated by ever present tradewinds. The beaches and reefs are untouched, and the population of approximately 40,000 resides in coastal towns scattered all over the island. The large town of Scarborough is the center of business and market life on the island.

Tobago is about 22 miles northeast of the island of Trinidad. Together they make up the two island country of Trinidad and Tobago. These are the most southeastern of all Caribbean islands, and are right off the coast of South America. Trinidad is a bustling center of oil and gas interests, a manufacturing center for electric components, and a progressive, forward-looking island. Tobago has remained quiet, retaining its Robinson Crusoe identity and providing rest and relaxation for its visitors. Its hotels and guest houses blend into the natural setting of tropical flora and fauna and provide excellent meals and services.

The culture of Trinidad and Tobago defies conventional labels. Although



the spoken language is English, the mixture of different cultures includes African, Indian, Chinese, Syrian, Portuguese, French, Spanish and English. This mixture has resulted in different foods and lifestyles that fascinate visitors. This blend of cultures has discovered the perfect fast food for calorie consuming divers. Its called roti (Ro-Tee) and is a crepe-like delight filled with your choice of spiced chicken, shellfish or meat. It takes the place of hotdogs and hamburgers and comes highly recommended.

The diving on Tobago is as diverse as the cultures that contribute to the island's heritage. Tobago does offer classic Caribbean anchor dives, where the boats pull up to a mooring and divers explore the reef, but there are also exciting drift dives where the current makes your fins the most under used piece of dive equipment. There are wall dives, dives on sloping reefs, and a couple of very exciting dives with conditions that are unique to Tobago. The island also offers you a chance to dive two different oceans on a single airline ticket: The Caribbean is on one side, the Atlantic on the

other. Since Tobago is 27 miles long and seven and one-half miles wide, there's more than enough coastline.

The diving can generally be broken down into three areas. The diving at Pidgeon Point, the diving on the Atlantic Side and diving at Speyside. The Pidgeon Point Aquatic Club is a private beach club and watersports complex on the island's finest beach. Aside from a few thatched huts and picnic facilities, Pidgeon Point is completely undeveloped. Directly offshore is Buccoo Reef, an attraction for snorkelers and divers alike. Glass bottom boats bring non-divers out to the reef for snorkeling and, since the water is only a few feet deep, even a novice swimmer can enjoy the trip.

The Pidgeon Point Aquatic Club is also the home of Dive Tobago, Ltd. Dive shop and storage facilities are

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Tobago offers something very special. There is a uniqueness to the style and quality of diving found on this little isle. Tobago's marine life is incredibly beautiful and especially rich in color. Much of this rich marine life can be found in depths of only 25 to 50 feet of water, making it possible for even the new diver to admire. The lower slopes of many reefs are covered with acres of virgin black coral. It is a virtual paradise for the undersea photographer, fish watcher, or reef explorer.

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TOBAGO

right at the entrance to Pidgeon Point. A tame monkey greets visitors from his perch in a tree next to the dive shop and introduces divers to Ray and James Young, the owners and operators of Dive Tobago. A tour of the well organized shop turns up two large compressors, a modern cascade system and all the tanks, weights, equipment and spare parts needed to run an efficient dive shop. The Young brothers are ably assisted by a friendly group of divemasters and boat captains. Moored directly off the shop are Dive Tobago's boats—28 foot Trinidad-built fiberglass pirogues. These boats are long and sleek, feature a high bow, and are kind to divers if it's windy or rough. The boats are limited to a maximum of ten divers (usually about eight) and are accompanied by a captain and divemaster. The dive boats regularly service two of the hotels on the island, Sandy Point Beach Club and Mount Irvine Bay Hotel. Once you have checked your gear with Dive Tobago, the dive boats, loaded with your gear and tank, will pick you up for a 9:30 am or 2:00 pm dive from your hotel dock.

Our first Tobago dive was on the reef right off the dive shop. Grouper Ground, depending on conditions, can be an anchor or gentle drift dive. Either way, it's exciting. The grouper welcome divers the way kids welcome Christmas. They are big and love to perform for the divemaster. Twenty pound grouper are considered small, ten pounders are midgets. Fifty to 80 pounders are not uncommon, and all but the very largest take flying fish offered as food eagerly.

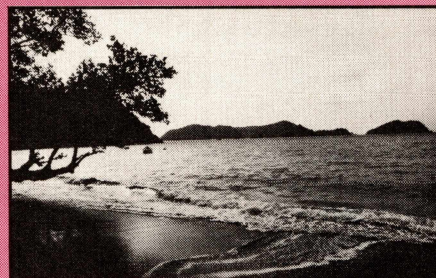
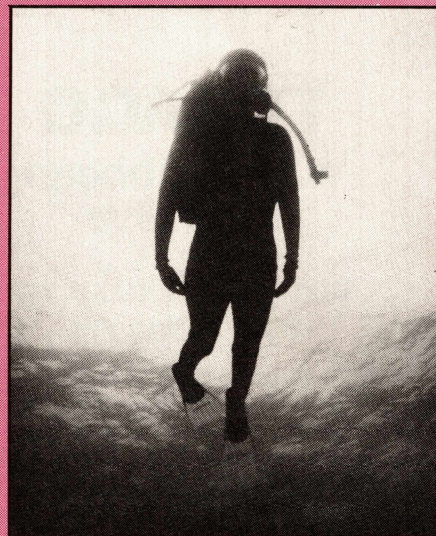
The size of the fish on Tobago is amazing. Grouper, snapper, turtles, barracuda and the entire family of reef fish grow to tremendous sizes here. The reefs are prolific and feature huge sponges, fans and brain corals. Basket sponges are the size of hot tubs. The reason for the large marine life is waters that are extremely nutrient rich. The nutrients come from the rivers of South America and from Tobago's own mountain run-offs. On occasion, during the rainy season (June, July and August), the water acquires a greenish hue as minerals and nutrients arrive.

After Grouper Ground, a sampling of the diving around Pidgeon Point turned up some real winners. At Arnos Vale and Mt. Irvine Wall, divers are treated to vertical walls that begin at the surface and plunge 30-50 feet to the bottom. Cuts and caves in the wall provide numerous subjects for a photographer. A 300 pound jewfish greeted me in one cut and I graciously allowed him enough room to exit at his leisure. Nurse sharks and lobsters are common in small caves and over-

hangs, and the walls are covered with sponges, crinoids and soft corals. The current was gentle on the dives.

A pilot's license is as helpful as a C-card on a Flying Reef dive. The current is strong, (usually three-quarters to over one knot) and even a very strong swimmer can make headway against the current for only a few seconds. This is when you use your pilot's license and just go with the flow. The current flies you along a sloping reef and, since the dive is only 60 feet deep, a diver gets to spend a lot of time on the reef.

Whether the current is gentle or strong, drift dives are handled safely and practi-



cally by the Dive Tobago staff. The divemaster carries a large, orange buoy attached to a line. The group enters the water at a count of "one, two, three, go!" and rides the current while keeping the divemaster and buoy in sight. When the divers run low on air, they ascend the line to the buoy and are picked up immediately by the drifting dive boat. Divers of all experience levels can enjoy this exciting drift.

If a diver wants a change of pace after diving the Pidgeon Point area, and providing winds allow it, boat trips to the Atlantic side of Tobago are made. The boats are fast and since gasoline is under 50 cents a gallon, the divemasters and captains welcome a chance to dive the less accessible sites. Red Rock, Bull and Calf, and Horse Head are all typical Atlantic drift dives. Seamounts rising directly off the bottom, they are covered with

sponges, corals and marine life.

And, if that's not enough diving, there's always Speyside. Remember the old adage that says that the more remote a destination is, the better the diving? Well, BWIA has made it easy to get to Tobago and the hotels and diving around the west end. But there's another area that is hiding some of the most exciting diving in the Caribbean. This is where the adage about remote destination comes in. At Speyside, on the eastern end of Tobago, big fish, fast currents, and prolific coral growth combine to make an experienced diver's paradise.

It's not that easy to get to Speyside. It's

about an hour and a half by car each way, but the time is well spent. The coastal road winds along the Atlantic and provides frequent views of deserted white sand beaches surrounded with lush green foliage. Small towns with names like Roxborough, Pembroke and Mt. St. George suddenly appear and are quickly passed. The trip to Speyside should be made with camera in hand because the scenery is beautiful.

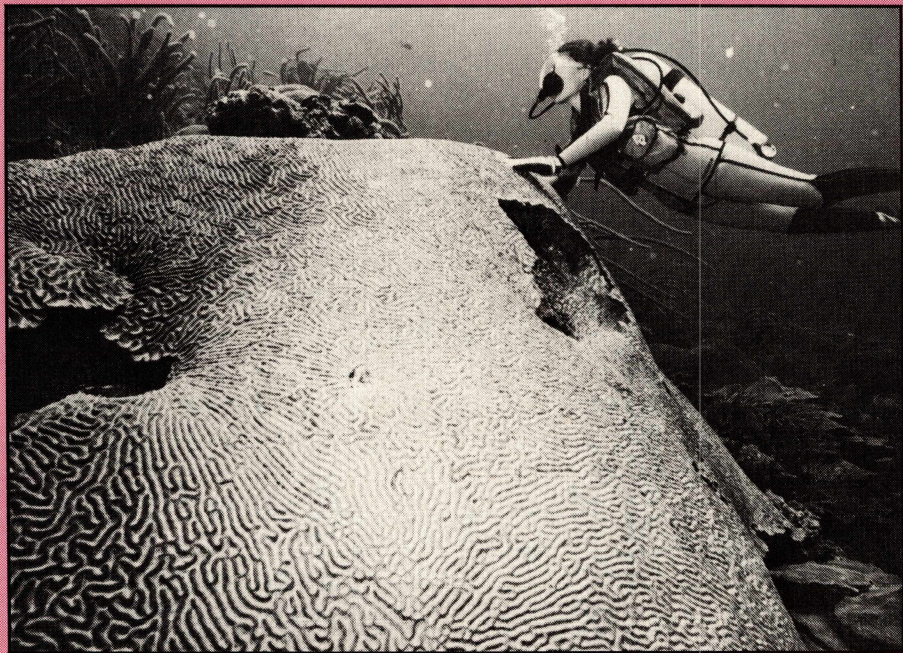
The islands of Little Tobago, Bird of Paradise, and Goat are directly offshore Speyside and offer spectacular coral formations and exciting drift diving. The currents run between the islands and vary in

speed from place to place.

"One, two, three, go!" The divers are over the side and headed for bottom at Japanese Gardens. The current is running and we're all are gaping at huge coral formations and giant fans bending to the whim of the current. About 20 minutes into the drift, the divemaster signals all the divers closer to him. Drawing around Ray Young, we cluster together and feel the pull of the current getting stronger. Gradually at first, then faster and faster, the divers bear down on Kamikaze Cut, a shallow cut in the reef that funnels water through at regulator taking speed. We fly through the cut and look to see what's ahead. As if sighing in relief, the water calms, the current slows to a crawl and our heartbeats return to normal.

Japanese Gardens was just one of the spectacular dives we made at Speyside. Luana's Love, Rocking Chair, Angel Reef and Black-Jack Hole are other dives at Speyside. While they differ in current and depth, they share a sense of remoteness and have an outer space quality unique to this end of Tobago.

Travel plans to Tobago are easy to handle. BWIA flights are comfortable and fast, and plenty of information is available from the Trinidad and Tobago Tourist Board. Complete hotel and dive packages are offered at two hotels, Sandy Point Beach Club and Mount Irvine Bay Hotel. Sandy Point is comfortable, easily reached, and provides efficiency rooms that are spacious enough for a traveling underwater photographer. Mt. Irvine Hotel is a classic Caribbean hotel that provides full services for its guests. Both hotels are served by Dive Tobago, Ltd.

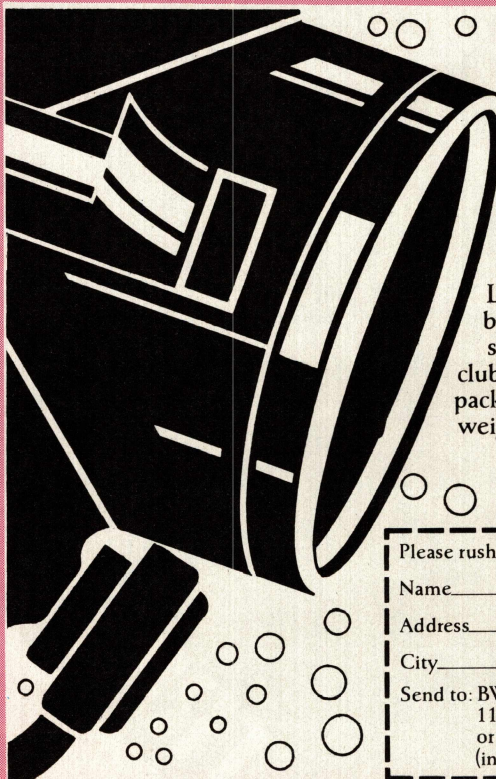


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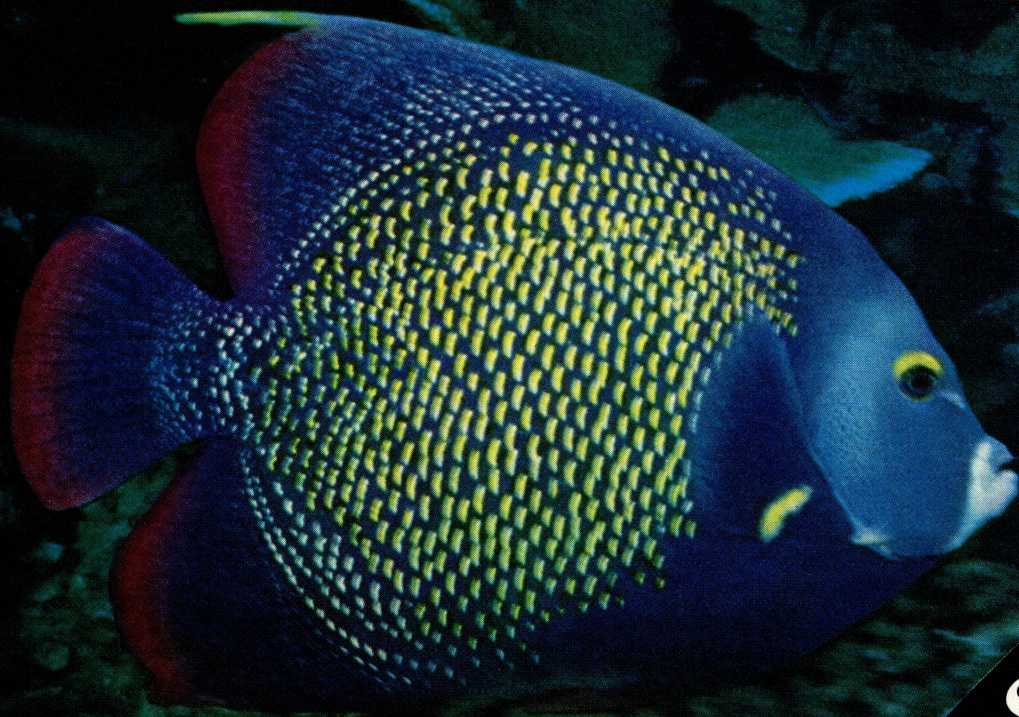
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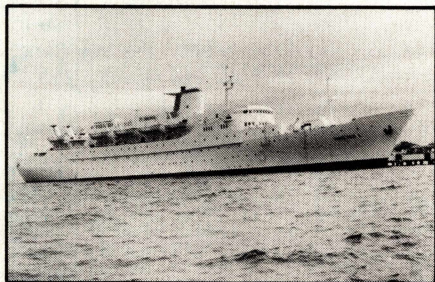
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A new feature has been added this year, called the Snorkeling Safari. An escorted snorkeling trip at each port of call, with full instruction and an entire take-home set of equipment including mask, snorkel, fins, tote bag, tropical fish identification card, snorkeler's manual, and a Sunseeker Holidays souvenir T-shirt.

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Special discount air fares are available from all major U.S. cities to and from the port of Tampa. Groups can qualify for special discounts and free travel for group leaders. For further information contact: Sunseeker Holidays, 1780 Broadway, New York, NY 10019; or call U.S. toll free (800) 442-2020; in New York call (212) 586-3441.

TURKS ISLAND DIVERS

Underwater Research has been renamed Turks Island Divers, Ltd. It is still owned and operated by Mike Spillar.

Along with the new name came two new compressors, 40 aluminum tanks, new regulators, buoyancy compensators, masks, fins and snorkels.

Operating from the Kittina Hotel, Turks Island Divers can accommodate up to 28 divers. The operation services the Kittina, Salt Raker, and Turks Head hotels, all of which are nearby.

For further information write or call The Turks & Caicos Reservation Center, 4197 Braganza Rd., Coconut Grove, FL 33131; (305) 667-0966 or Turks Island Divers, P.O. Box 119, Grand Turk, Turks & Caicos Islands, British West Indies.

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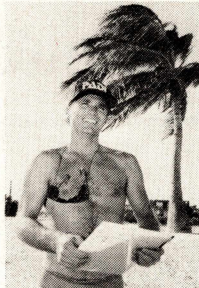
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TOBAGO PACKAGES

The Crown Reef Hotel on Tobago now offers a scuba package. The program provides lodging at the hotel (at Store Bay), two daily boat dives (12 dives in eight days), unlimited air fills, access to sunfish sailboats, boardsailers and paddleboats, transfers to and from the airport, and breakfast and dinner daily. The package was organized by Adventures Unlimited, Trinidad and Tobago, Ltd. For more information call weekends away Travel at (800) 327-9543.

Also, dives are now offered in Man of War Bay (on the north coast) by Tobago Scuba Ltd., operated from Dive Tobago, a new scuba shop owned and managed by Jane Boyle in Charlotteville. For more information write Jane Boyle, Speyside, Tobago, West Indies.

Make air reservations by calling BWIA International at (800) 327-7403; in Florida (800) 432-5622. Or contact the Trinidad and Tobago Tourism and Trade Center, 200 SE First St., Suite 702, Miami, Florida 33131. ✕

COCOS AT CHRISTMAS

Amos Nachoum will escort a dive cruise aboard the 78 foot staysail motor sailor *Free Spirit* on December 20-January 2 to Cocos Island. The cruise is limited to eight divers. Cocos is 300 miles west of Costa Rica, and 220 miles north of the Galapagos Islands.

Other departure dates in 1983 on board the 115 foot motor schooner *Soal* are February 14-25, March 7-18, and April 11-22.

The *Soal* is a steel motor sailor, fully equipped for diving. It has two compressors, 24 aluminum air tanks, four speedboats, and can accommodate 12 divers.

For further information and reservations contact: La Mer Diving Seafari, Inc., 823 UN Plaza, Suite 810, New York, NY 10017; (212) 599-0886. ✕

ANTHONY'S KEY IMPROVEMENTS

The owner/managers of Anthony's Key Resort, Roatan have just completed extensive modifications and improvements to the resort's fleet of dive boats. There is a new 40 foot custom diesel vessel and the *Albacore* and the *Macavi* have been upgraded. The boats are now equipped with VHF marine radios, heavy duty steering and engine control systems, and feature sun roofs and transom doors. Heavy duty ladder and platform systems have been installed. Anthony's Key now has dive equipment and can provide total support for individuals, couples and groups of up to 60 divers.

For information contact: Anthony's Key Resort, 3803 Wagonwheel Court, Plano, Texas 75023; (214) 423-5656 or (800) 527-4319. ✕

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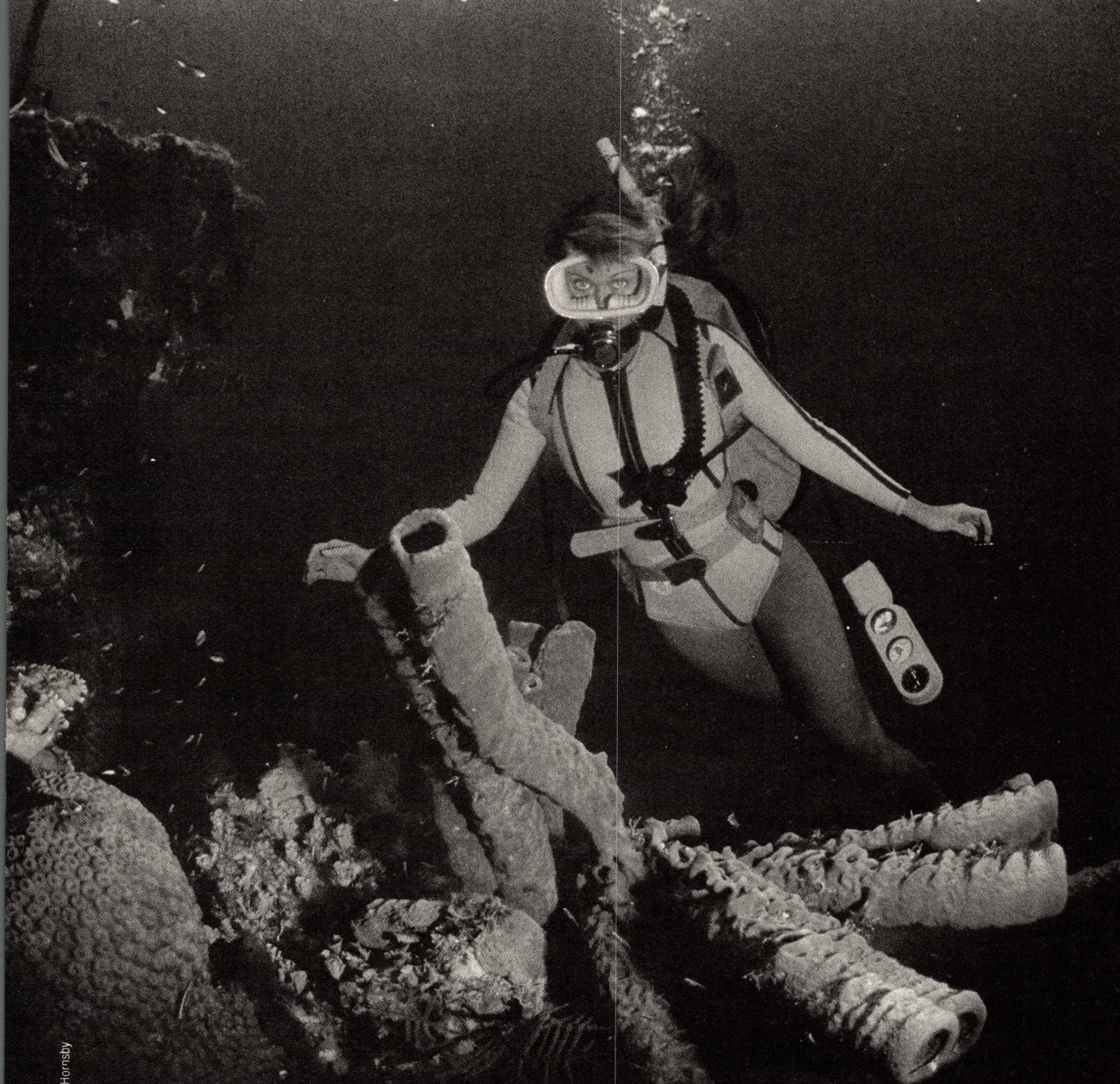
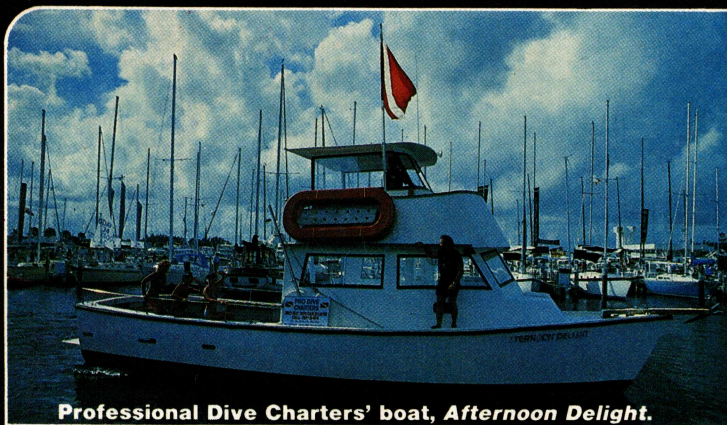


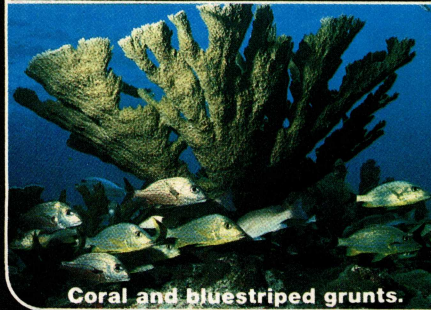
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TEXT AND PHOTOGRAPHY BY AL HORNSBY



It may be diving's most unusual contrast, the view below, a rolling coral bottom teeming with darting tropicals: The view above, a sparkling city skyline. This is Ft. Lauderdale, long famed as Florida's hottest spring vacation destination. To thousands of college students, Lauderdale is the original beach party hangout. The strip still swings and throbs with its pulsing rock beat. Singles swear by Lauderdale—if you can't enjoy yourself here, you probably can't enjoy yourself anywhere.

So, what does this have to do with diving? That is Lauderdale's big surprise. For once you discover the area's remarkable dive scene, you may find you never again have to make the choice between swim and swing.

Washed by the same Gulf Stream currents which nurture well-known Pennekamp Coral Reef Park just miles to the south, Lauderdale's extensive reef sys-

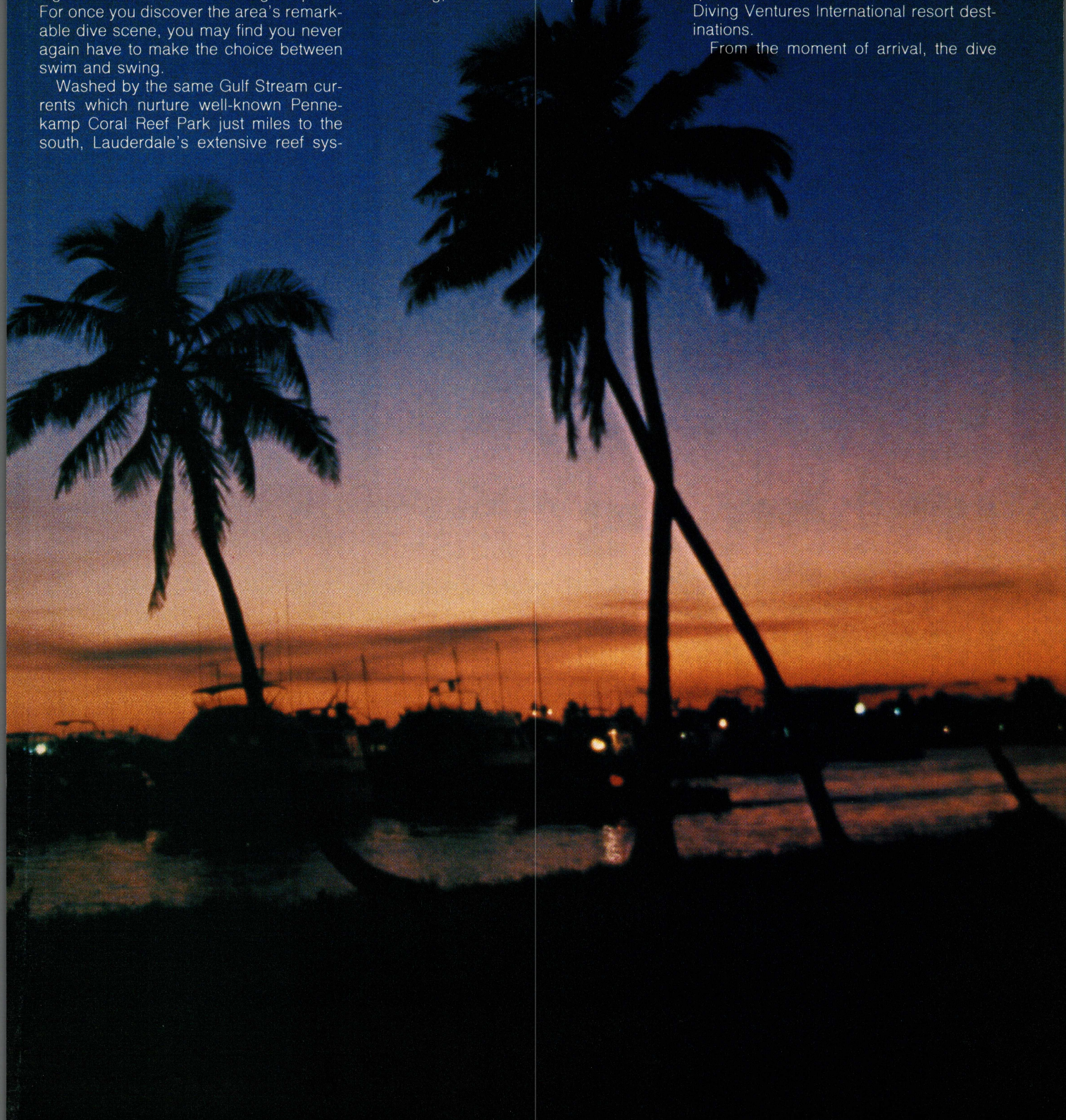
tem is a well-kept secret. If this is because local divers want to keep the lobster and fish-filled reefs to themselves, it would be difficult to blame them.

While visibility averages 40 to 60 feet, 60 to 100 foot limits are not uncommon. Divers visiting these reefs for the first time are usually surprised to discover the thick coral growth and huge fish populations. Actually, the Lauderdale reefs are but the northern stretch of the huge reef line which runs the entire length of the Florida Keys—its beauty is known to divers around the world. Because of this excellent diving, the short boat trips to the best

dive sites, and the excellent services available, Ft. Lauderdale is a great dive vacation destination. Stated simply, if you like to dive in the daytime and party at night, this area is definitely for you.

The only dive operation which runs boats to the Lauderdale reefs is Professional Dive Charters of Florida. In the beachfront Bahia Mar Hotel and Yachting Center complex, Pro Dive is a PADI Five Star Facility and, it features two large, comfortable vessels which can handle a total of 50 divers. The quality program and excellent dive package offered has qualified the location as one of PADI's Diving Ventures International resort destinations.

From the moment of arrival, the dive



FT. LAUDERDALE

program is blessed with a touch of class. The hotel, managed by the well-known Omni International Group, is a luxury resort (the baskets of chocolate-covered strawberries and welcome cards which awaited us in our rooms were impressive indeed). The custom boats used are 36 feet and 40 feet respectively. Both are very comfortable and feature covered areas, walk-through transoms for easy entry and exit, free beverages and flying bridges for sunbathing. Captains and crew are certified PADI instructors and divemasters who know the area reefs intimately. Despite the gourmet food and swank accommodations, the dive packages are low in price.

While all the favorite dive spots are too numerous to describe, just to whet your appetite let's take brief look at a few of the finest. All are less than 30 minutes from the Bahia Mar Marina dock.

The Oakland Ridge: Directly east of the Lauderdale strip is a landward facing ledge in 50 feet of water. Two and one-half miles long, the ridge runs parallel to the beach. The reef face is 15 feet high and festooned with holes and grottos. Depending on the slight current, dives



The Ft. Lauderdale reefs are excellent for underwater photography with a variety of marine life including corals and tube worms.

here can be either anchored or drift. It is one of the area's favorite lobster spots and Pro Dive Charters' Captain Steve jokingly guarantees "bugs on every dive."

Becky's Ledge: North of Oakland, this

site is less than a mile offshore. The top of the ledge is at 40 feet and drops to a sand bottom at 55 feet. Scattered coral heads and healthy sponge growth make this area reminiscent of Florida Keys diving, but there are usually more fish at

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Becky's than on the reefs further south. For photographers or spearfishermen (some spearfishing is allowed from Pro Dive Charters' boats), it is a delight. Groupers, snappers, jacks and lobsters are plentiful. Huge schools of grunts roam the area; sometimes they are so thick divers feel they must push their way through.

Abby Too: A popular dive spot just north of Hillsborough, this ledge is in 35 feet of water. Dropping in places to as deep as 70 feet, it is loaded with marine life. Besides a healthy fish population, turtles—big green sea and loggerheads—are most always seen. Dolphins frequent the area, and on several occasions, divers from Pro Dive Charters' boats have enjoyed their playful companionship.


Houseboat: One of the many wrecks in the area, it sits on a sand bottom in 85 feet of water. Patch reefs surround it, and fish life is heavy. The wreck is open enough to allow divers to swim in and out through the various cabins and passageways. A solitary barracuda often guards the bow, and a large school of 'cudas sometimes hangs silently over the craft.

Cumberland Barge: Further to the north, this is an exciting dive. In shallow water (less than 30 feet), the vessel's superstructure and steel ribbing rise nearly to the surface. Comparable to Cayman's *Balboa* wreck in fish life, the hulk teems with grouper, schooling snappers, hogfish and a myriad of brightly colored tropicals. One of the area's most popular night dives, this spot is protected from currents and is excellent for close-up photography. Lobsters and many species of marine invertebrates may be seen.

Hojoe's: In the mid-reef zone, this twin-ledge horseshoe is in 30 feet of water. Low coral growth, seafans and seawhips cover the bottom and marine tropicals are plentiful. This is a favorite area for collectors and fish photographers.

All in all, Ft. Lauderdale diving, though less deep, is similar to the more popularized Palm Beach offerings. However, since it is further south, the coral growth is thicker—similar to that in the Upper Keys—and there is much less current. In addition to the Palm Beach-like reef ledges, there is also a complete shallow reef system with growths of elkhorn, staghorn and other fragile corals.

The next time you are considering a Florida dive vacation, don't forget there is life north of the Keys—fish life and night life. From the reefs to the strip, from the beaches to the nightclubs, and all in between, Lauderdale is one dive town that sizzles.

For complete information on diving Ft. Lauderdale, contact: Pro Diving Charters, Bahia Mar Yachting Center, Ft. Lauderdale, FL 33361, phone (305) 761-3414; Diving Ventures International, PADI Headquarters, 1243 E. Warner Avenue, Santa Ana, CA 92705, phone (714) 540-7234; or your PADI Training Facility. 



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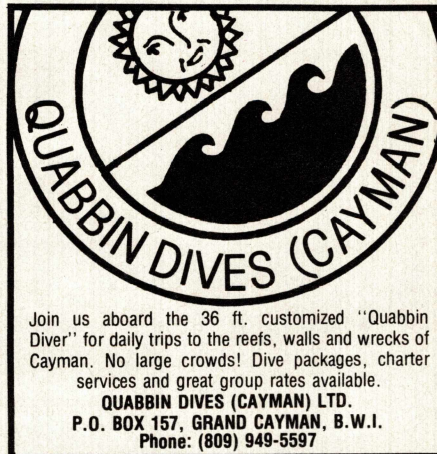
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The Turks and Caicos Islands are approximately 575 miles southeast of Miami and about 400 miles northwest of Puerto Rico, directly in the heart of some beautiful water. Two rather distinct groups of islands, each surrounded by an extensive reef system, they are separated by a 7400 foot deep trough known as the Turks Island Passage. This cut connects the Atlantic and Caribbean and contributes to the dramatic profusion of marine life distributed throughout the islands. The Turks group is comprised of Grand Turk and Salt Cay predominantly, while the Caicos are made up of South Caicos, Middle Caicos, East Caicos, North Caicos, West Caicos, Pine Cay, and Providenciales. However, top-side support for the scuba diver exists on only five of the islands—Grand Turk, South Caicos, North Caicos, Pine Cay and Providenciales (known also as Provo).

I flew to Grand Turk from Miami aboard an Air Florida 737. The flight takes less than three hours. Arriving in Grand Turk, I was unprepared for the flat and somewhat desolate nature of the island's topography. Cockburn Town is certainly low-key. This is the seat of government and center of population for Grand Turk, and while growth and construction are evident, the feeling is very quaint and picturesque. The beaches are blessed with beautiful sunsets daily. The main thoroughfare, Front Street, is a steady parade of children on bicycles, donkeys foraging for food scraps, old men reminiscing, and the movers and shapers of com-

merce conducting daily business. Weatherbeaten wood stands in contrast to concrete and tinted glass in a community caught at the crossroads of progress.

During my stay on Grand Turk, the Kittina Hotel was by base of operations. Owned by Kit and Tina Fenimore and operated by experienced hoteliers, Peter and Joan Van Allen, the Kittina is very comfortable and features excellent food. The Salt Raker Inn and the Turks Head are nearby. All three hotels are directly across from the beach, within walk-

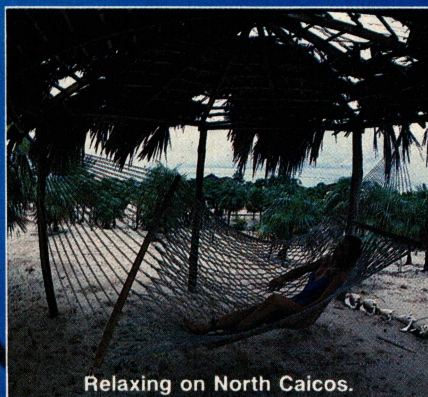
ing distance of everything in Cockburn Town. Mike Spillar has chosen the Kittina as the home of his business, Turks Island Divers.

Mike came to Grand Turk from Texas by way of Florida in his search for an undeveloped area offering top-quality diving. Grand Turk qualifies in both regards. Divers board his 32 x 16 foot flattop directly from the beach and are transported to the shallow reefs and drop-offs just one-quarter to one-half mile offshore. Mike's farthest run is less than 30 minutes and his closest dive spot puts you in the water ten minutes after you leave the

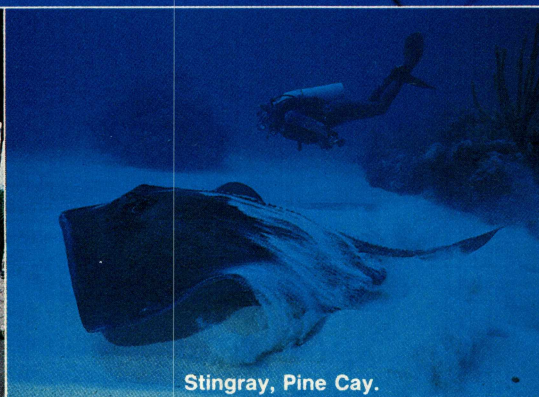
Turks & Caicos

The Sleeping Giant of Dive Resort Destinations

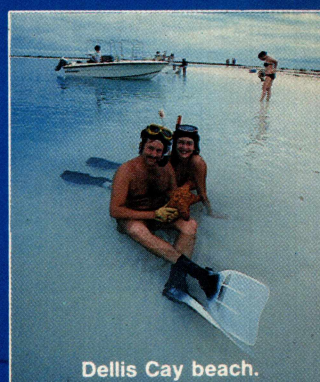
TEXT AND PHOTOGRAPHY BY STEPHEN FRINK



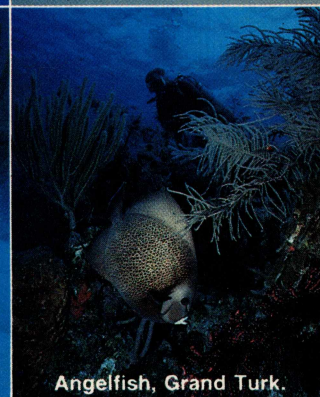
Relaxing on North Caicos.



Stingray, Pine Cay.



Dellis Cay beach.



Angelfish, Grand Turk.

Wall diving, South Caicos.



Conch fisherman, Provo.

beach.

The most spectacular dives in Grand Turk involve the 7000 foot drop-off paralleling the leeward shore. This is a vertical wall, beginning in 40-50 feet of water, heavily encrusted with sponges, gorgonians and corals. However, there are some very distinct dive sites along the wall featuring quite unusual underwater formations.

In an area Mike calls the Black Forest, black coral starts at 60 feet in an area cut back into the wall's face. There are massive concentra-

tions of it along this wall with numerous colorful sponges interspersed. Just off the wall, several species of pelagics are regularly sighted. The Amphitheater features a circular sandspit channeling into a dramatic wall beginning at 45 feet. Average lateral visibility is around 100 feet and the dimensional perspective of seeing the lush, high profile corals of the shallows combined with the deep blue of the drop-off was quite memorable. This area also provided a high concentration of tropical species in the shallower areas.

My favorite wall dive, however, was an area Mike dubbed the Tunnels. Jumping in

the water, I found a school of more than 15 Atlantic spadefish circling the anchor, a portent of further marine wonders which must occur daily at this site. After swimming through the encrusted tunnel for which the area is named, my first sight along the wall was a magnificent blacktip reef shark. Horse-eye jacks were evident in several areas, as were an assortment of tropical and pelagic species, even a turtle. The Tunnels ranks among my top ten Caribbean dive sites, and may be in the

top three.

Island-hopping in the Turks and Caicos is very easy and moderately priced via Turks and Caicos National Airline (TCNA). Flights operate daily and there is really no reason not to include two or more different islands during a visit here. Our next stop after Grand Turk was South Caicos and a visit to the Admiral's Arms Inn.

Promoted as an operation run "by divers, for divers," the Admiral's Arms is a rather Spartan resort providing economy diving packages. There are no casinos, color television, or hot tubs here; but there is a Bristol Bluewater 34



Island Princess, Provo.



Kittina Hotel, Grand Turk.



Erebus, Provo.



Third Turtle Inn, Provo.

foot flattop able to transport up to 32 divers quickly and efficiently. The dive operation is run quite professionally by Turk-Cai Watersports. The dive program typically includes two morning dives, one to 100 feet and a second dive in the 25-30 foot range. Afternoon dives are available, as are night dives.

At present there are about 12 different dive sites along the wall, which starts in 60 to 80 feet and drops to over 7200 feet. Divemaster Bill Heeth has been exploring areas not typically dived and hopes to expand the number of sites available. Right now there are about 10 shallow sites vis-

ited regularly, as well as eight to ten mid-water sites for the afternoon dives. As a result, divers on the standard eight day, seven night package have no trouble getting a wide variety of quality diving.

Among the popular spots is the Arch, a mid-water reef with average depths of 50 feet. There is a great deal of sponge and moderately high profile coral, as well as the dramatic swim-through archway. Elkhorn, Indiana is the most famous of the shallow water sites because schooling eagle rays are frequently seen.

The deep dives such as East Grotto and West Grotto are characterized by

large coral heads with sand channels leading to a vertical drop-off. Along the wall are numerous species of tube sponges, seaweeds and various hard corals. Grouper, jack and the occasional shark cruise the wall, as do the rarer African pompano. The wall diving throughout the Turks and Caicos is quite spectacular, and, in my experience South Caicos had the best sponge encrustation.

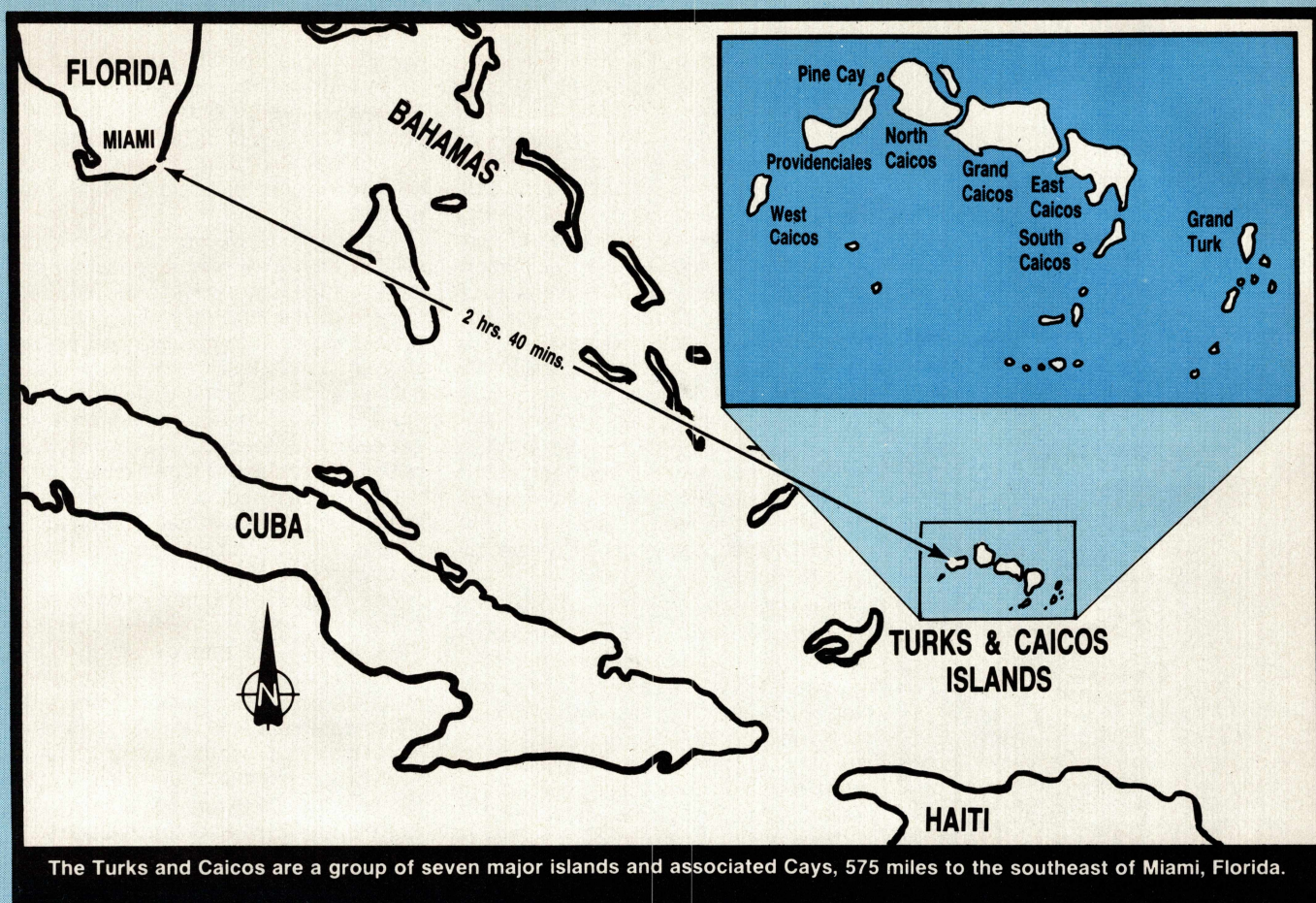
Turk-Cai Watersports and their state-side booking agent, Co-pilot Tavel, have been aggressively promoting their destination for a number of years. They are used to dealing with groups of divers traveling on dive packages, and seem to structure their program to the requirements of each group. The dive sites are selected democratically (with the ultimate direction of the divemaster), and if necessary, a new location could be chosen for each dive. The hardcore diver seeking maximum water time will probably be well-pleased with a South Caicos vacation.

Progress has come slowly to North Caicos, and judging by the buildings visible between the airport and the Prospect of Whitby Hotel, life is rather austere. The Prospect of Whitby has luxurious accommodations and beautiful grounds. Steve and Anne Peddrick operate this lovely 26 room resort in a very gracious and civilized manner. The rooms are all air-conditioned, there are tennis courts and a freshwater swimming pool, a sand beach with excellent shelling and beach-combing, a central lounge and lending-library, as well as superb cuisine.

The Prospect of Whitby caters to a more affluent clientele, and the participants in the diving program seem to be looking for a vacation with diving included, as opposed to a dive vacation per se. Other watersports such as fishing, snorkeling, water skiing, shelling excursions and beach parties can be arranged any day weather permits (about 325 days per year).

For those wishing to participate in the dive program, there are generally two dives per day. The first has a maximum depth of approximately 110 feet. There are six sites for these deep dives marked by buoys and within each major area there may be as many as seven specific dives. Generally these are long ridges beginning at about 45 feet and dropping to the sand bottom around 110 feet. However, these are not vertical walls but gradual slopes with an occasional mini-wall. Within these deep areas are the whole potpourri of Caribbean corals—brain, star, elkhorn, staghorn, pillar, etc., as well as a heavy concentration of grouper, triggerfish and other tropicals. Visibility is good and the dive operators are very accommodating.

The second dive of the day is always shallow, perhaps in the 25 to 40 foot



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TURKS AND CAICOS

range. Apparently there are several wrecks and some lovely reefs, but our time did not allow thorough exploration.

There is one catch that tourists traveling to North Caicos should be aware of, however. The diving off the Prospect of Whitby is on the windward shore; the same wind and wave action that brings shells, bottles and fishing floats to the shoreline daily may also cause dive cancellations over the course of the year. On

those days tennis or a beach party at Delis Cay might be the answer.

One of the high points of my Turks and Caicos excursion had to be the time spent on Pine Cay at the Meridian Club. Pine Cay is a small island, only one mile by two miles, and is a combination resort and real estate development under the direction of Bill and Ginny Cowles. Because of the Cowles' dedication to conservation and alternate energy sources, there are very few gasoline engines on the island, and all tourist transport is accomplished by electric carts. There is an efficient water catchment system on the island, and many of the vegetables are from the island's own gardens.

The work of the PRIDE group (Protect our Reefs and Islands from Degradation and Exploitation) is very evident throughout the island in projects such as conch mariculture, education and alternate energy research.

The accommodations at the Meridian Club are definitely quality. The units are spacious and right on the beach to take advantage of the tradewinds. There is a central bar and dining area with a lovely freshwater pool. The food is excellent and service, impeccable. For the serious diver, even more importantly, the dive operation is also first class.

The watersports activities on the island are under the direction of Meridian Ma-

rine, owned and operated by Gary and Ilene Adkison. Their rental and compressor facility is directly adjacent to the boats and they have an excellent staff of local employees. Most dive trips are aboard their 34 foot Bristol Bluewater flat-top but they also have a speedboat available for quick excursions with small groups.

The one night dive we made during our stay at Pine Cay was a model of efficiency and demonstrates the concern Gary and Ilene give their dive operation. After a short run to the dive site, we anchored up for a light snack and watched the sun go down. Jimmy Buffett softly serenaded us as the group became acquainted and geared up. The dive itself was quite spectacular. The exhilaration of the dive combined with the gregarious nature of the crew to create a party atmosphere for the return home and a very positive memory.

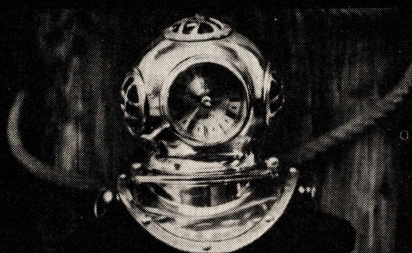
That particular dive happened to be at a spot the Adkisons named Eagle Ray Pass. There was a sand bottom at 45 feet with high profile coral creating a mini-amphitheater around the sand spit where we anchored. There was no reason to stray more than 100 yards in any direction from the anchor line. Other areas visited regularly include a number of reefs with a dramatic spur and groove system. These generally start at the top of the coral at about 40 feet and drop to around 110 feet at the base. In several areas the sand grooves lead to drop-offs of 130 feet or more. Horse-eye Reef and Black-Jack Wall are specific areas within the more generic Blue Hills area.

The most typical corals in these areas seemed to be star and brain, but there is some beautiful shallow diving and snorkeling around the island's barrier reef with excellent stands of elkhorn and staghorn. The grouper were extremely easy to approach, and other species frequently sighted included spadefish, schooling Bermuda chub, triggerfish, angelfish, jack and even a couple of sharks in the blue-water distance.

One interesting aspect of the dive package with Meridian Marine is that at your option you can make one "exploratory dive." This will be a spot that the divemasters have never seen, and because so few people have ever visited this area, in all probability it may never have been seen by divers. It may or may not be as spectacular as some of the dives made on a regular basis, but there is a certain intrigue to the unknown, making the option very interesting.

In addition, there are numerous fascinating and historic islands surrounding Pine Cay which are easily accessible by boat. Fort George Cay contains the rubbled remains of a British fort which held troops for ten years in response to a suspected Haitian slave revolt. Today this area is best known for the bottles, ballast stones and cannons to be found in four feet of water at the ocean's edge. Parrot

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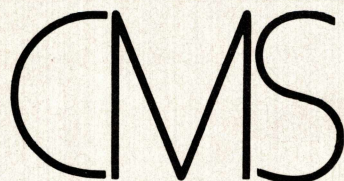
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Cay is nearby and is reputed to have been the model for Peter Benchley's novel *The Island*. However, it must have been a very loose model, fueled by a vivid imagination. Dellis Cay and Little Water Cay are also easily accessible from Pine Cay and are excellent areas for shelling or picnics.

The final stop along our Turks and Caicos sojourn was Providenciales (Provo), the fastest growing and most urbane of the islands in the chain. Our home for the visit was Erebus at Latitude 22°, owned and operated for the past four years by Gordon and Maureen Boeder. The Erebus is a series of individual cabins built on a hillside overlooking the scenic Third Turtle Harbor. Aside from the normal amenities you would expect from a quality hotel, the Erebus also features a cool ocean breeze and an excellent view of the sunset from a private balcony.


Also on the harbor is the Third Turtle Inn, under the competent management of Gale Anspach. I had known Gale during his tenure at Cayman Kai resort, and it was a pleasure to run into him again. The Third Turtle Divers, operated by Art Pickering and Paul Hudson, provides the diving services for both resorts. A third hotel on the island, the Island Princess, also has diving available.

Art Pickering has been in the Turks and Caicos for quite awhile now and definitely

home in areas like the South Bank, a shallow reef of 40 to 60 foot depths at the edge of a drop-off. Eagle rays and sharks are occasional supplements to the normal reef populations in this area.

The North Reef features a massive swim-through cave with an entrance at 60 feet and an exit at 120. In addition, there are a lot of medium depth reefs in 45-55 feet, featuring small canyons of high profile corals. Again, because of time limitations, we were only able to barely sample the diving available off Provo. The one deep dive we made was quite outstanding. We had pet groupers

performing for the camera at 110 feet and encrusting sponge for color accents everywhere.

As you tour the islands today you will find your credit cards of little use and most of the roads unpaved. Most of the areas you will dive have not been extensively explored, and you may get into some water where no one has ever been before. But, all the elements for significant growth are apparent. I enjoyed the pioneer spirit that prevails in the Turks and Caicos today, but I also feel that inevitably these islands will become a major Caribbean dive destination. 




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The Turkeyfish

(*Pterois volitans*)

The turkeyfish has been described as bizarre but beautiful, calm but deadly, stately but voracious. It is often called by other names: lionfish, firefish and butterfly cod. Scientifically it is known as *Pterois volitans*, two words that mean feather, and to fly. The reference is to the feathery, wing-like appendages of the turkeyfish, which give it the appearance of being able to soar. Ichthyologist John Randall indicates that lionfish is a name reserved for members of the related genus *Dendrochirus*. □ Australians call it the red firefish, because of the sting of fire which comes from the nerve toxin contained within the dorsal spines. Divers are always cautioned to treat the turkeyfish with respect, and aquarists are warned never to handle the fish with bare fingers since the poison of the dorsal fins automatically ejects upon touch. Because the turkeyfish has few enemies, it is unafraid of other fishes or even of divers who can swim quite close for observation or photographs. □ *Pterois volitans* is found off Australia and in the Red Sea. It is also widespread in the Indian, South and Central Pacific Oceans, although Dr. William N. Eschmeyer of the California Academy of Sciences indicates that the Indian and Pacific Ocean species may possibly be the separate *Pterois meleni*. Eschmeyer, in identifying the specimen on these pages, pointed out that the upper four to five pectoral fin rays are bent back on themselves, or possibly malformed. Turkeyfishes grow to a maximum of 15 inches in length, and normally these rays are long and wide. □ The turkeyfish is a member of the scorpionfish family,



Scorpaenidae—a group noted for rough, bumpy, spiny bodies. Where there is color these fishes are often red. As their common name implies, there is often an ability to sting, the weaponry usually within the dorsal spines. The turkeyfish is not quite as venomous as the related stonefish, *Synanceja horrida*, which appears as a lumpy, drab rock on the bottom, deceptively camouflaged and without the stately elegance of brilliant stripes. □ The coloration of the turkeyfish, although bright to the eye of the diver, is an effective camouflage to other sea creatures. The numerous stripes, which can vary between red, brown, or near black against an off white, conceal the eye of the fish. The long spines and the knobby cirri of the chin add further camouflage and give the fish an appearance of being a floating plant. Many smaller animals never see the fish-beast approaching. □ The turkeyfish is a voracious carnivore and stalks its prey with a deliberate, slow-moving action. The ribbon fins wave gently back and forth as the fish makes its way across the bottom like a drifting clump of weeds. When it corners its victim—usually a small fish or crab—it spreads its gill covers wide and makes a sudden, open-jawed attack. The victim is literally swept into the turkeyfish mouth by a powerful water suction. □ In captivity the turkeyfish is normally fed small, live fish, although they may be trained to accept pieces of dead fish. Aquarists are cautioned against placing small turkeyfishes with larger specimens as the latter have been known to turn into cannibals in the company of juveniles. 🐟

Photo By Carl Roessler-Text By Hillary Hauser

Roessler photographed the fish in 40 feet of water off Aqaba, Jordan. He used a Nikon F camera in a Niko-Mar housing, with 55 mm micro lens, and Bauer E252 strobe. Kodachrome 64 shot at f8, 1/60, two feet from subject.

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A package of five two tank dives, including equipment and transportation, is available. Proof of certification is required along with a free check-out.

Unlimited one tank dives, without transportation from Trelawny Beach, are offered by Tojo Watersports' shop at Ocho Rios.

Tojo Watersports will also arrange dives for Trelawny Beach guests at any JADO (Jamaica Association of Dive Operators) in Negril, Montego Bay, Discovery Bay or Runaway Bay.

Complimentary snorkeling, sailing, boardsailing, waterskiing, glass-bottom boat rides and tennis are also included as part of the daily and weekly rate at Trelawny Beach Hotel. The 350 room, full-service resort is 30 minutes from Sangster International Airport in Montego Bay.

Hotel reservations are available from LRI offices; Jamaica Reservations Service, (800) 327-5767, in Florida, (800) 432-7959; and Caribbean wholesalers.

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Two programs in diving medicine have been scheduled for the island of Bonaire by Medical Seminars, Inc. The first will be on December 4 - 11 and the second on February 5 - 12. The courses will be held at the Flamingo Beach Hotel and will feature a complete dive program in addition to the academic seminar.

For brochure and information, please contact: Helen Turcotte, Medical Seminars, Inc., 11406 Whisper Moss, San Antonio, Texas 78230; phone (512) 492-5656.

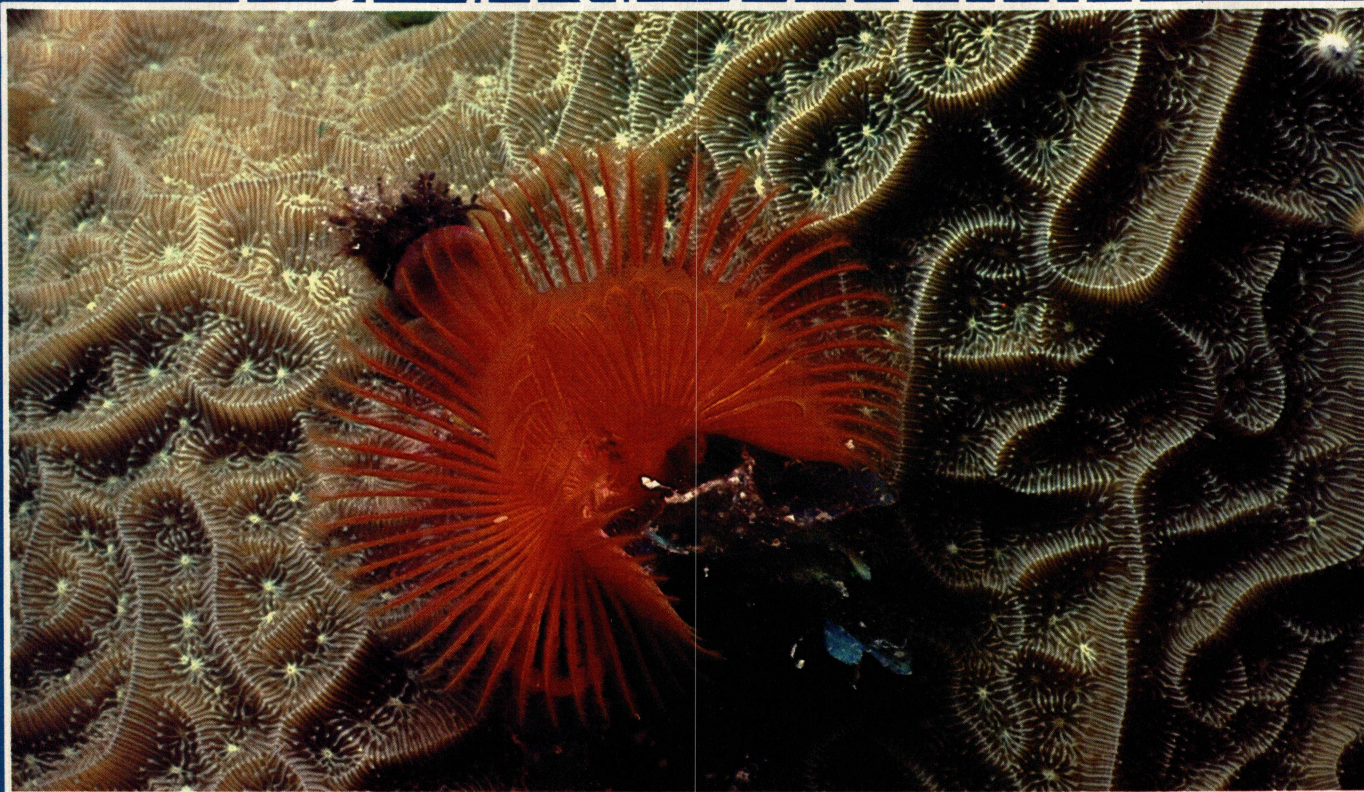
BOTTOM TIME

The high speed, 65 foot, floating dive resort, *Bottom Time* will be offering dive packages to virgin dive areas in the lower Bahamas starting in March. Staniel Cay, Allan's Cay, Crooked Island, the Plana Cays, and Mayaguana are among the many islands to be explored.

The Bottom Time will also be offering whale and dolphin study expeditions with the Living Ocean Society in the same area during April.

For information contact: Bottom Time Adventures, Inc. P.O. Box 030100, Ft. Lauderdale, FL 33303.

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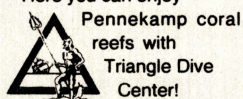
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The book is co-authored by photographer Erwin Christian, who has lived on



the island of Bora Bora and run a dive operation there since 1967. Sea Safaris utilizes his dive services for its clients.

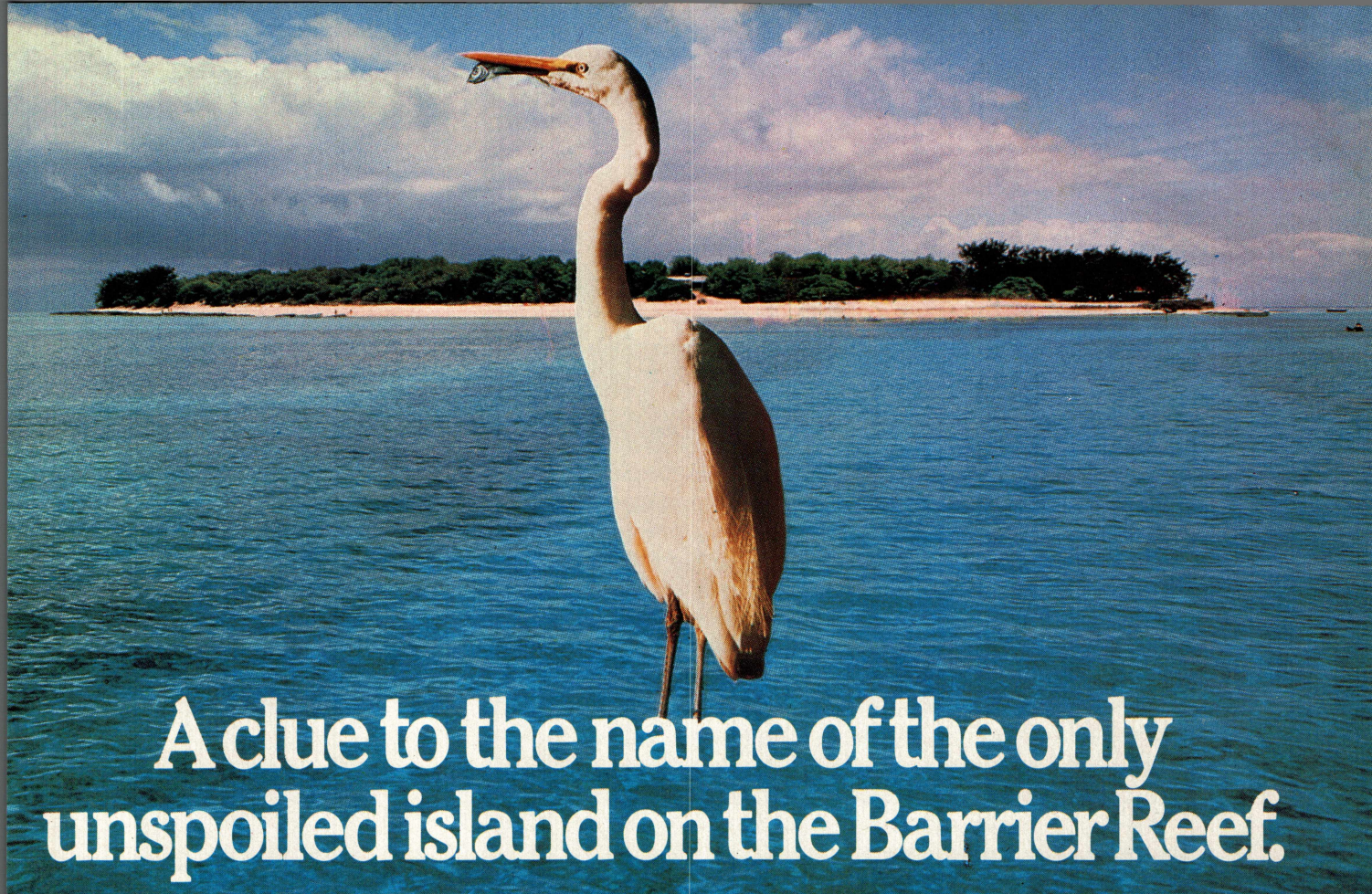
The *Underwater Guide to Tahiti* retails for \$12.95. Please include \$3 for shipping and handling within the U.S. Send your requests to either Sea Safaris office: 3770 Highland Ave., Suite 102, Manhattan Beach, CA 90266; or Sixty 98th Ave., Suite 102, Oakland, CA 94603.

Fishes of Polynesia, a hardcover book also co-authored by Christian, is available for \$49.95 from the same addresses. Include \$6 for shipping.

GRAND CAYMAN DINING GUIDE

The Grand Cayman Dining Club Restaurant Guide offers residents and visitors to Cayman discounts and special offers at 13 of the island's restaurants. Each of the coupons in the guide has a description of the respective restaurant including: menu, hours, dress code, credit cards accepted, phone number and location. Each discount or free offer is good for up to four people.

The guide is on sale for \$5 CI at hotels and condominiums on the island. For further information contact: The Grand Cayman Dining Club, P.O. Box 482, George Town, Grand Cayman, BWI; telephone 95387.



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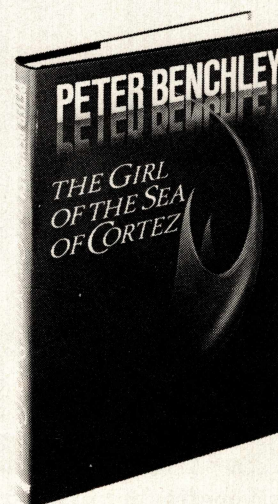
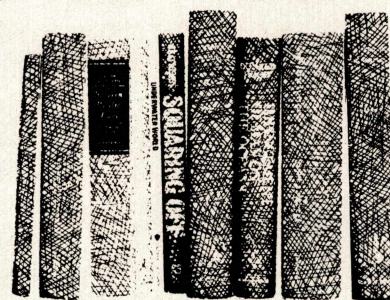
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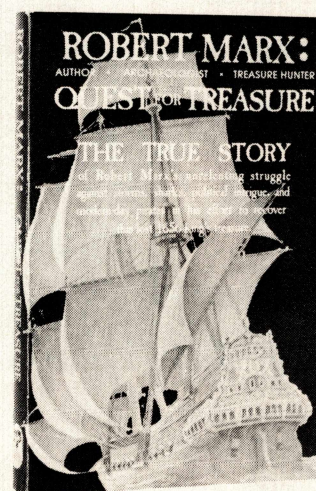
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New Books

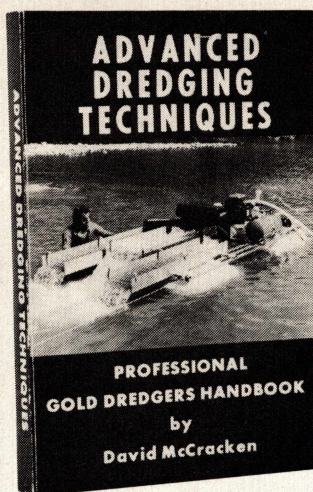


1 The Girl of the Sea of Cortez —

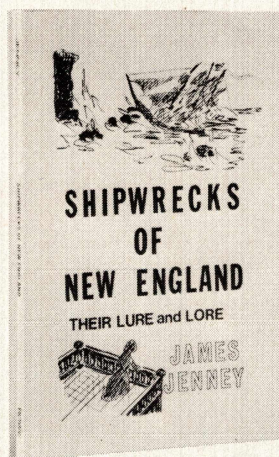
This novel by Peter Benchley is a fictional account of a young native girl and her experiences free diving with sea creatures, including a huge manta ray which befriends her. Adventure, danger, suspense. \$13.95. Doubleday & Company, Incorporated, Garden City, NY.



2 Quest for Treasure—Written by noted treasure hunter Robert Marx, this book is the complete story of his research, discovery and salvage of the Spanish galleon *Nuestra Senora de la Maravilla*. Complete with danger and intrigue. \$9.95. Ram Publishing Co., Dept. QT1, P.O. Drawer 38649, Dallas, TX.



3 Advanced Dredging Techniques—This guide by professional gold dredger David McCracken covers such topics as: equipment, picking a site, dredging techniques and miner fellowships. Includes many photos and diagrams. \$7.95. Keene Industries, 9330 Corbin Ave., Northridge, CA 91234.

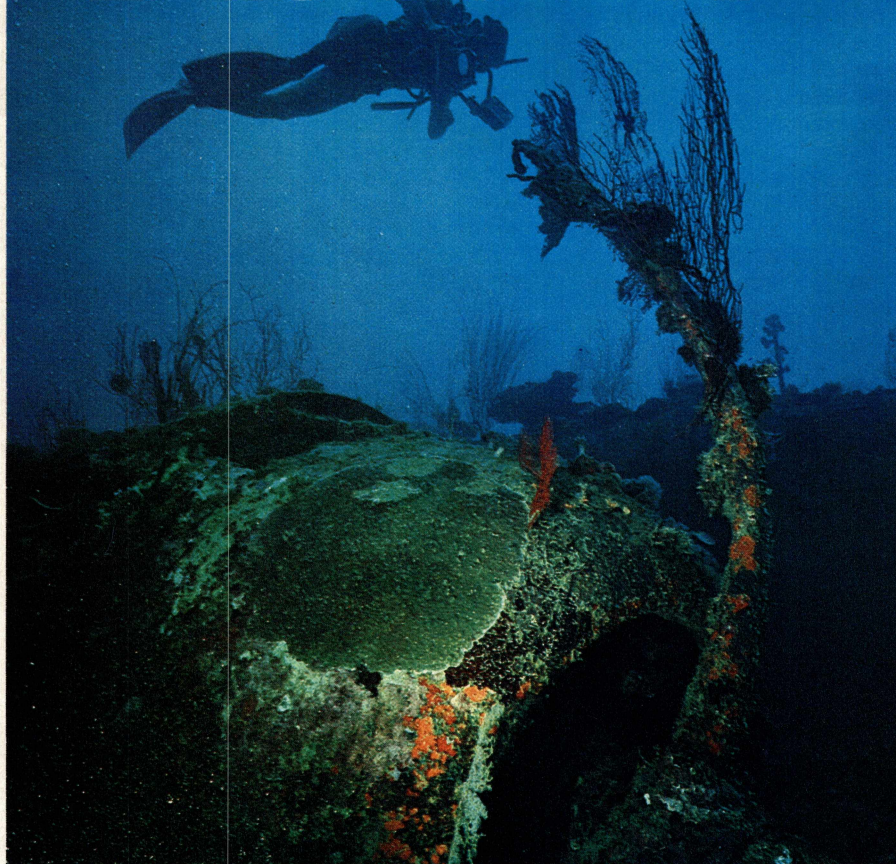


4 Shipwrecks of New England—After a brief discussion on how to study and map out wreckage on the bottom, this book continues with accounts of the sinking of steamships and sailing vessels in the New England area. Probable locations included. \$6.95. Rowe Publications, 3906 N. 69th St., Milwaukee, WI.



5 Subsea Manned Engineering—An up-to-date summary of recent developments in deep diving technology. Topics include submersibles, decompression chambers, underwater habitats, life support systems and one atmosphere suits. Many illustrations. \$42. From Best Pub. Co., Box 1978, San Pedro, CA 90732.

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the Wondrous World of Worms

BY DEE SCARR

photos / Karl Wallin

Let's face it—worms don't exactly have the best reputation in the world. Traditionally, they're what brave little boys use to tease squeamish little girls. They're for putting on hooks to catch bass with. They're for biology students to dissect. They're certainly *not* for admiring! Some marine worms are very different from what people expect to see when a "worm" is pointed out, however. Gone is the ugly color and naked skin. Worms blossom in the sea, literally.

Surely the most beautiful of the marine worms are the filter feeders. Commonly called Christmas tree worms, tube worms or fan worms, these come in all the colors of the rainbow. The Christmas tree worms (Serpulids) feed and breathe with twin featherlike tentacle clusters, called radioles, which blossom like two trees at the head of each animal. Other tubeworms have single radioles, and grow in groups or singly. The tubes grow on or out of coral, rock, or even a sandy bottom.

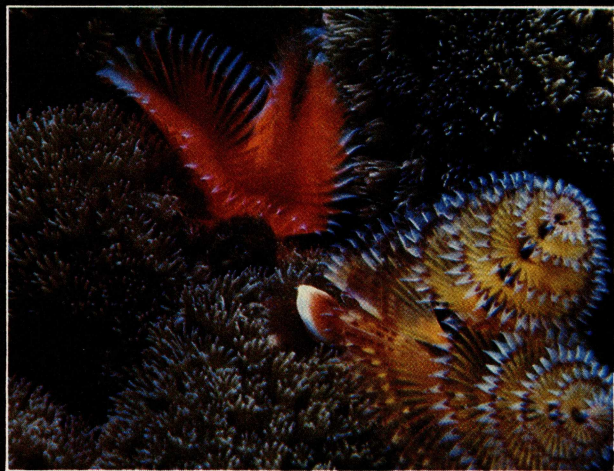
There is more to the worm than just this "blossom," of course—inside each tube is a worm's body. But this traditional body is forever hidden in its tube and only the feathery gills are displayed to the world.

That is, *sometimes* the feathery gills are displayed to the world. At a shadow, a wave of the hand, even, seemingly, a glance from a diver, the worms retract their vulnerable blossoms down into the tubes. This retraction is a protective device: surely no predator can penetrate the tube!

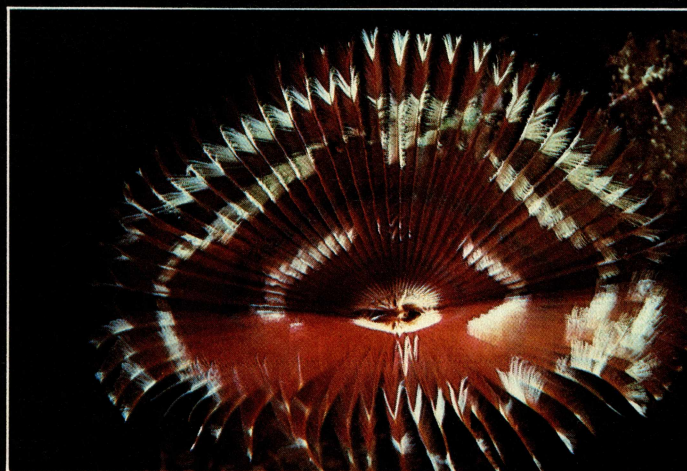
The soft-tubed (Sabellid) worms, often called featherdusters, must be unpalatable, for their homes are fragile and neither tubes nor radioles are ever seen injured. The crown of expanded radioles can reach 10 cm in some species. Some Sabellids occur on reefs in groups of dozens of individuals. The crowns of radioles sway together with the surge. Often, if one individual is stimulated to contract suddenly, all the others in the group will follow.

A more delicious morsel must be the Christmas tree worms: their tubes are calcareous, providing a positive protection: When they retract into their tubes the entrances are covered by a hard operculum and further protected by a calcareous horn. Despite all this protection, however, an occasional slowpoke is nibbled upon, and it is not unusual to see a Christmas tree worm with one whorl nipped off.

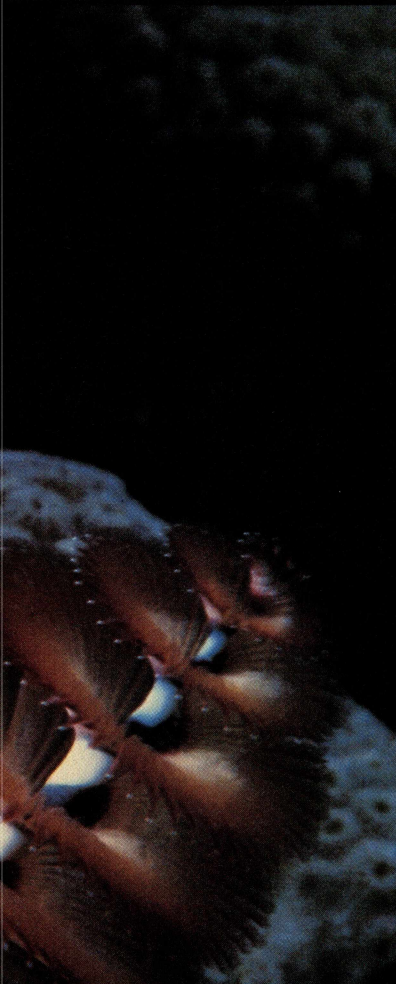
So there you have it: worms can be ugly, slippery, naked creatures. But undersea, worms can be wonderful. Watch a worm (or two, or ten) on your next dive. 🐛



Serpulid, Cayman.



Sabellid, Bonaire.



Serpulids and Phoronids
(not true worms),
Cayman.



Serpulids, Monterey, CA.



Serpulid, Belize.



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TEXT AND PHOTOGRAPHY BY RICK FREHSEE



World famous as a game fishing paradise for more than 50 years, Bimini is now coming into the spotlight as a first-rate diver's destination. A skinny island nearly seven miles long and seldom more than a few hundred yards wide, Bimini is just 60 miles east of Miami, making it the closest foreign island to the U.S. mainland.

With such an obvious geographical advantage it would seem that Bimini would be overrun with divers, but it isn't. Until recently the island was the happy diving ground of a few stateside charter boats and a small number of south Florida divers in Gulf Stream-hopping speed boats. Bimini's diving has simply been overshadowed by its sportfishing. Now, with a steady, year-round growth in resort diving, the tables are turning.

Neal Watson's Bimini Undersea Adventures is on the southeast end of North



Above: Atlantic Coastal Charters flies to Bimini from Ft. Lauderdale. **Opposite:** a diver and grouper at Victory Reef. **Insets:** Neal Watson leads a Bimini wall/drift dive. Watson surveys his new 40 foot boat.

Bimini at Brown's Hotel and Marina, an island landmark. The dive shop is small, but orderly, with individual bins for equipment. The compressor is behind the shop for noise control. Watson has two 20 cfm Worthington compressors and 10,000 cubic feet of air storage. There are 20 complete sets of rental gear and 150 steel tanks on hand.

Undersea Adventures' fleet of dive boats includes a brand new 40 foot diesel custom, a 40 foot, 20 passenger diesel and a 28 foot T-Craft, ten passenger boat. The new 40x14 foot boat is a handsome showpiece and a no-nonsense divers' craft. Features include a rugged dive platform, step-through transom, sit-down tank racks and large storage areas. It is equipped with a marine head, oxygen, two marine radios and depth recorder—all Coast Guard approved. The other boats are similarly equipped but not as handsome. There is also a 24 foot service boat and several rubber chase boats available.

Bimini has great diving even in front of the main island, but you'll miss the spots completely without an experienced guide. There are a wealth of healthy coral and prolific fish life to discover here because of the constant flushing action of

the Gulf Stream across the bank. Winter-time can bring the occasional cold front and with it a serious reduction in visibility. But, after the front passes, one tidal change can bring back crystal clarity.

Neal Watson is the holder of the world's record for deep diving, the scuba distance swimming record, and has set a record flying from the U.S. mainland to the Bahamas in a toy helicopter. With that background you might think that you are in for meeting a fool or a braggart. Watson is neither. He is smart, sensitive and an excellent dive partner. His physique suggests that he is training for some other Herculean feat. Those who know him well say that he has mellowed somewhat over the years and that his more than pretty wife, Vicki, and three energetic kids have had a lot to do with it. At this point in life he is obviously taking care of business, but this is not to say he has lost his very dry sense of humor nor that he is willing to rule out the possibility of taking a crack at another distance record in the future. I like diving with Neal, but it should be mentioned that he is, as he says, "blessed with an excellent staff." The Sewell gang, two brothers Jimmy and Donny, and Gary Cash, a cousin, are all employed by Bimini Undersea Adventures. The Sewells are born and bred Biminians and have grown up diving here. All are excellent divemasters and are very popular with visitors.

At present, no one knows the Bimini dive spots as well as Watson and the Sewells. Undersea Adventures can entertain a dive group for an eight day week and not dive the same site twice except by popular demand. The diving includes shallow, intermediate and deep reefs as well as drift dives, night dives and wreck dives. For our rapid-fire three days we asked for a sampling of sites.

We started with Moray Alley, just north of a large reef area known as The Kinks. Here we found large coral heads rising in popcorn shapes some 18 to 20 feet off a 65 foot sand bottom. The scenery includes a good variety of coral, sponges and schooling fish. Large, easily approached Atlantic stingrays burrowed into the sand channels and a couple of huge green morays poked their serpent heads out from clefts in the reef. Our visibility was a respectable 80 feet or better.

North and inside from Moray Alley we dived at Hawksbill Reef in 45 feet of water. This area features scattered low profile heads festooned with lots of finger and vase sponges.

That afternoon we tried a wide area known as Turtle Rocks, which starts at a chain of low-lying islands south of Bimini and follows the contours of the Great Bahama Bank. Turtle Rocks is smorgasbord diving, with something for everyone. There are actually three separate dive sites anywhere from 20 to 50 feet deep, some areas with large solitary coral heads and others with extensive long-

running ledges and overhangs. Big grouper are often sighted here, even in the shallow water.

The following day we headed for the Victory's and one of the most beautiful reef systems on this side of the Bahama Bank. This is the longest run taken during the normal week. The one hour and 15 minute trip takes a full day, with lunch aboard and a third dive at a selected site on the way back to Bimini. The 150 foot visibility was a definite treat. The slanted bottom contours ran from 35 feet westward to 80 feet and a sand bottom. The reef featured no particular spur and groove system but was very compact and well-layered with corals, caves, ledges and overhangs decorated with buff-yellow tube sponges, red elephant ear sponges and rope and finger sponges in a variety of hues. Atop the reef was a moderate meadow of purple seafans and fuzzy seaweeds. The visibility was truly awesome and kept that way by a one-quarter knot current which moved any stirred sand to the north. Filing through the reef were schools of snappers, schoolmasters, mackerel, permit, jacks and several solitary grouper in the 25-30 pound class. An odd school of four good-sized pufferfish momentarily interrupted a continuous parade of creole wrasse. Two inquisitive angelfish followed Neal through a coral grotto in an undersea version of follow-the-leader. A couple of giant hogsnapper followed us on our drift with the slight current back to the anchor line. Victory Reef will never convince you that you are less than 100 miles from the U.S. coast. It's a real wilderness dive that gives you everything that the Bahamas is famous for.

On the way back we dived at Pickett Rocks. This reef has a flat sand bottom punctuated with coral heads, reef platforms and tables of coral. Extensive ledges and undercuts beneath the reef tables allowed numerous grouper and a couple of cubera snapper to feel comfortable in our presence. Over the reef moved grunts, snappers and goatfish in huge schools too numerous to count—all in 35 feet of water.

The next morning provided us with the flat seas and excellent conditions we wanted for Watson's continental shelf or Bimini Wall dive, normally the highlight of the week for visiting divers. If this dive fails to excite you your only hope is a trip to the Great Barrier Reef.

Watson's wall dive is one of the safest and best planned experiences in deep diving. It is so well engineered that it is possible to include intermediate divers as well as those who are already experienced at depth. The visibility is seldom less than 100 feet and often as clear as 150 feet. At 140 feet you can look upward and see other divers, the line and float, and the boat in a dramatic silhouette. The lip of the wall begins at 125 feet and a lush forest of deepwater fans,

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black coral and riotous orange and red sponges passes by the fragile parts trembling in the moving water. Often, schools of horse-eye jacks, mackerel, kingfish and other pelagics are sighted. On this dive you may catch a glimpse of a dolphin, hammerhead shark or even a rare billfish, for it is out here that a quarter of the world's big game fishing records were attained. There is seldom a one degree temperature change from the surface to depth and the unlimited scenery is exhilarating.

That afternoon we had an interesting shallow scuba and snorkel dive on Bimini's most famous shipwreck. The *Sapona*, marked "conspicuous wreck" on the charts, is for the most part out of water and visible from miles away. The slanting bow is broken off and angles away from the main section. Her hull is in 20 feet of water, creating a safe and interesting dive. She offers protection for a variety of marine life including great schools of yellowtail, snapper, striped grunts, and sergeant majors which cavort about in a large cavity near the stern.

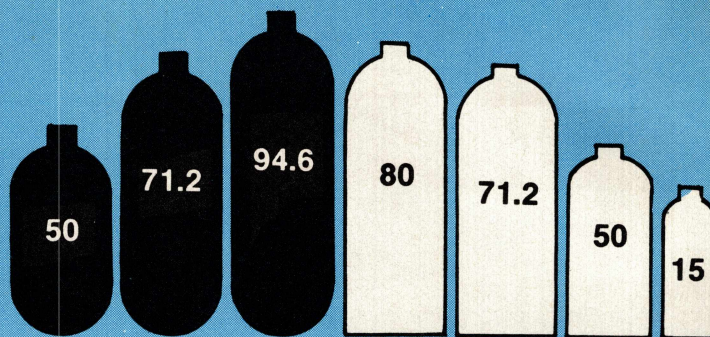
Another famous Bimini dive is a large area off Paradise Point known as the Atlantis Site. Here, mostly in 18-20 feet of water, are a series of large, mysteriously squared-off encrusted rocks which look like the pathway of an ancient city. I have photographed this curious area dozens of times for credible scientific and educational organizations and for various TV programs, adventure magazines and psychic organizations. The psychics and the adventurers all insist that this is the remains of an ancient city—possibly a satellite of Atlantis—while more sober investigators have indicated that it is a natural formation called beach rock.

A Bimini report is not complete without some reference to the island's spontaneous and happy night life. Bimini is known as a fun spot after sunset and up until the early hours of the morning, if you can take the pace. Not that it is a Nassau or a Freeport; it is not. Bimini is a shaggy paradise at best. There are no casinos or fancy discos. Just a handful of low-key lounges, bars and game rooms dripping with island atmosphere and frequented by a small crowd of escapists, locals, fishermen and divers. Although the emphasis shifts from one night spot to the next over the years, your best bet is the Complete Angler where you'll be able to relax with a cold girl (local beer) in a room filled with island memorabilia and Hemingway photos and clippings.

There is also a straw market, shops, liquor and food stores and a beautiful stretch of beach on the western side of

TANK SYMBOLS

What Does It All Mean?



BY BONNIE J. CARDONE

Have you ever taken a careful look at your scuba cylinder? Most divers are aware that the service pressure and a hydrostatic test date appear on their tanks, but they'd be hard pressed to tell you what any of the other numbers, letters or symbols mean. Well, when you finish this article you should be able to decipher those mysterious looking marks.

At present, there are only two companies making scuba tanks in the United States: Luxfer is the source of all aluminum tanks and Pressed Steel makes all steel tanks. Scuba cylinders have long lives: Not all of the information given here will apply to some of the older ones.

ALUMINUM TANKS

Luxfer USA, of Riverside, CA, produces all aluminum tanks made in the U.S. and Canada. A wholly-owned subsidiary of Alcan UK Ltd., Luxfer introduced aluminum tanks to divers in this

country just 11 years ago. At that time there was just one size. Now there are four sizes. In addition to the original 71.2 cubic foot tank there are 80, 50 and 15 cubic foot tanks.

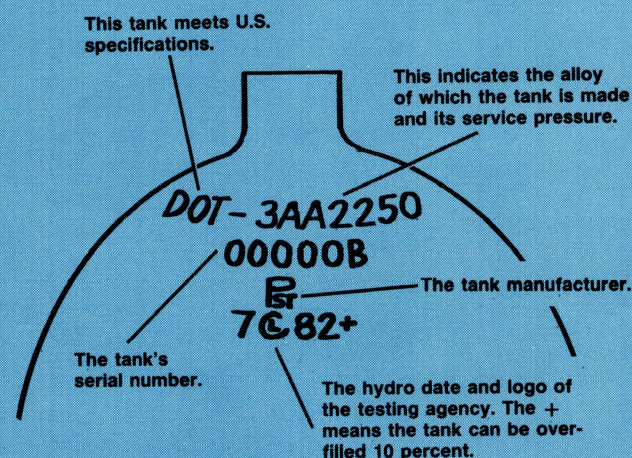
As of July 1, 1982, the Department of Transportation adopted new regulations regarding aluminum scuba cylinders. One of these is that such tanks must bear the manufacturer's name only and may no longer carry the name of the company that buys it for sale to the public. Other regulations have to do with the composition of the aluminum alloy used and the manner in which the tank is made. In the absence of printed DOT specifications for this, aluminum tank manufacturers were assigned a number beginning with an E (for Exemption) or SP (for Special Permit). This number had to appear on the tanks the company made. The SP number was issued when the company first went into business and was kind of a

temporary permit to make tanks. After the company had been in business awhile, it was issued a number beginning with E: This was its permanent permit. After July 1, of this year however, the E and SP numbers were no longer used. All aluminum scuba tanks are now stamped 3AL, which is the DOT specified aluminum alloy of which they are made. When the older E and SP tanks are next hydroed, they too, must be stamped 3AL.

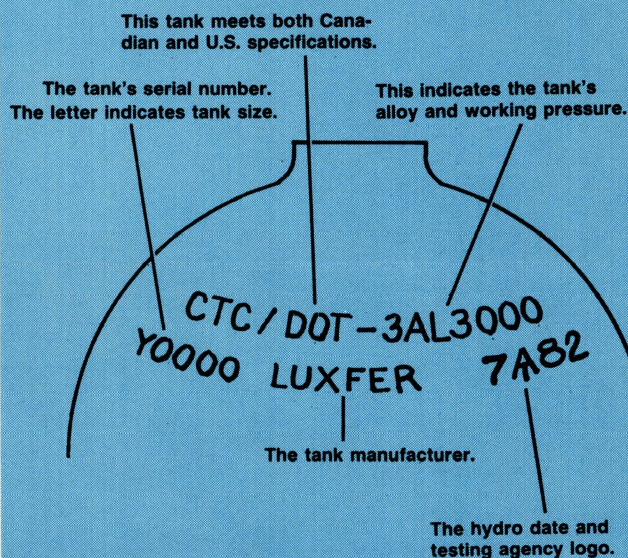
If you look at the drawings that appear on this page, you will see the symbols, numbers and letters that are found on tanks. Let's look at the aluminum 71.2. The top line reads: CTC/DOT-3AL3000. CTC stands for Canadian Transport Commission, the Canadian equivalent of our DOT. Tanks with this designation meet Canadian specifications (identical to ours) and can be sold in that country. DOT means Department of Transportation, the agency that regulates scuba

Steel and aluminum scuba tanks come in several different sizes. Although the markings look confusing, they are easy to decipher.

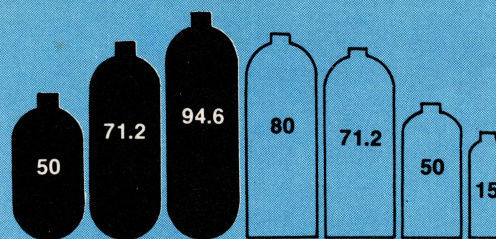
STEEL



ALUMINUM



TANK SYMBOLS



tanks. Older tanks may be stamped ICC (Interstate Commerce Commission) because that agency formerly regulated scuba tanks. (Why do scuba tanks come under DOT jurisdiction? Because they are defined as containers in which compressed gas is shipped.) The 3000 that comes after 3AL is the service pressure of the tank. This means it may be filled to 3000 pounds per square inch (psi) maximum. Three of the four aluminum tanks available have service pressures of 3000 psi; the exception is the 15 cubic foot pony bottle which has a service pressure of 2015.

The second line on the aluminum 71.2 begins with the tank's individual serial number—a letter followed by a four or five digit number. Luxfer uses the letter to identify the size of the cylinder: a P appears before the serial number of all 80 cubic foot cylinders; a Y on all 71.2's; an R on 50's; and KK on 15 cubic foot tanks. After the serial number is the name of the manufacturer, Luxfer. After that is the month and year of the first hydrostatic test. In between these is the symbol of the independent agency which inspects the tanks to make sure they meet DOT specifications. Authorized Testing, of Riverside, CA, inspects Luxfer tanks. The company's symbol is a big A with a T inside.

STEEL TANKS

All steel scuba cylinders now being made in the U.S. are from Pressed Steel of Milwaukee, Wisconsin. The company makes tanks in three sizes: 94.6, 71.2 and 50 cubic feet. Let's look at the markings on the 71.2. The top line reads DOT-3AA2250. DOT, of course, is Department of Transportation. 3AA denotes the alloy of which the tank is made, chrome molybdenum steel. Older tanks may be stamped 3A, which denotes carbon steel. The service pressure of the tank appears after 3AA. On 94.6 cubic foot tanks this is 3000; on 71.2's, 2250; and on 50's, 1800 psi.

The second line on the tank is its individual serial number, a five or six digit number which may have one or two letters after it. Under the serial number Pressed Steel's initials, PST, appear. Below these are the month and year of the first hydro with the symbol of the inspection agency between them. Cochran Laboratories inspects Pressed Steel tanks. The company's mark is a big C with an

L in it. New tanks usually have a plus sign after the year of hydro. This means that additional criteria have been met and the tank may be overfilled ten percent above its service pressure. Thus, a 94.6 tank may be filled to 3300 psi, a 71.2 to 2475 and a 50 to 1980. Steel tanks are usually given this plus only the first time they are hydroed. After the second or third hydro they will not have a plus and may not be overfilled. Also, this plus only occurs on steel tanks—you will never see one on an aluminum cylinder.

IMPORTED TANKS

One dive equipment company in the U.S., Cressi-sub, sells foreign made tanks. These can be used here only if they conform to DOT specifications, but need not have DOT stamped on them. Cressi's galvanized steel tanks are imported from Italy in two sizes: 106 and 71.2 cubic feet. Both have service pressures of 3000 psi. These tanks are made by Faber and marked in metric: The volume is in liters, the service pressure in kilograms per centimeter squared, the weight of the tank in kilograms. Cressi also sells aluminum tanks, made here by Luxfer.

UNCOMMON TANKS

West Coast divers are likely to come across new 45 cubic foot steel tanks. Norris Industries of California produced 6000 of these earlier this year. When they are sold, Norris will be out of the scuba market. The 45's are not stocked by any dive equipment company but are available from some dive stores. These tanks differ from the steel 50's in their working pressure, 2015 as opposed to 1800. Also, they bear the Norris Industries logo, an N inside a diamond, and the Cochran Laboratories CL between the month and year of hydro.

Norris Industries also produced steel 71.2's earlier this year (April was the last month). These tanks have a six digit serial number preceded by HJ. The N inside a diamond precedes the hydro date and appears again between the month and year. Cochran Lab's mark appears after the plus sign.

Walter Kidde of New Jersey used to make scuba cylinders and may resume production of aluminum 80's later this year. Just before the hydro date, these tanks will have a WK. The inspection agency's logo is an arrowhead with an A


in it, which stands for Arrowhead Industrial Services, Inc.

There is one other cylinder which should be mentioned. Marketed by Submersible Systems, Inc., it is a two cubic foot aluminum cylinder with its own regulator. Called the Emergency Breathing System (EBS), it is less than 16 inches long, has a diameter of two inches and a service pressure of 1800 psi. It is made by the Cliff Impact Division of Parker Hannifin Corp. in Cleveland, Ohio. It is not required to have a serial number or to carry the stamp of the testing agency that inspects it. It undergoes hydrostatic testing before it leaves the factory and never needs re-hydroing. The tank carries the following letters and symbols: DOT-E7737-1800; Cliff Div., O4-82. There is also a stylized P for Parker Hannifin. E7737 is the specification (exemption) number issued to the company by DOT.

FUTURE TANKS

In researching this article I learned of an unusual tank that may appear on the market in the near future. Cylinder Technology of Chanute, Kansas has been testing a stainless steel tank for eight years. It will be just 23 inches tall and weigh 23 pounds, but will hold 89 cubic feet of air and have a service pressure of 4000 psi. In comparison, aluminum and steel 71.2's are about 26 inches tall and weigh about 30 pounds when empty. Stainless steel tanks will be sold directly to dive shops and will come without valves. Although there are no valves being made in the U.S. that will handle 4000 psi, Sherwood plans to produce these when needed. (Foreign valves may not be used here because they don't have DOT required burst discs.)

MORE INFORMATION

If you want to learn more about scuba tanks, valves, hydrostatic testing, burst discs, etc., you may want to peruse Scubapro's new book, *Recreational Diving: A Complete Text*. Written by Dr. Tom Jerussi, it sells for \$10 at dive shops. NAUI's excellent book, *Scuba Tanks: High Pressure Cylinders for Diving* is being revised. Written by Robert Gonsett in 1973, some of the material in it is outdated, but it is still an excellent source of information on the subject. You can't buy it any more, but if you have an old copy, hang on to it. We'll let you know when the new text is available. 

BIMINI

the island. Don't miss the conch salad, conch fritters and delicious Bimini bread. Everything is within walking distance in Alicetown. Dress is always casual; if Bimini were any more laid-back it would be out cold.

Undersea Adventures provides packages with two hotels, Brown's and the Bimini Big Game Club. Brown's rooms are decent, air-conditioned and have hot-water showers, but are by no means elegant. The restaurant serves adequate meals in good-sized portions.

If you wish a first class stay there is a deluxe dive package with MAP (breakfast and dinner) at the Bimini Big Game Club. Owned by Bacardi International, it is the best place to stay on the island and rates, food, atmosphere, and service are in keeping with the best in the Bahamas. The manager of the club is Michael Kaboth, who used to manage the Current Cut Club on Eleuthera. The deluxe rooms, gourmet meals, polite, attentive service, tennis courts, pool and patio bar can be worth the additional \$20 a day. For budget minded divers, Brown's is available and the dive shop and boats are on-site.

The Bimini Undersea Adventures package is complete and offers three dives



Bimini Big Game Club

per day (two on the day of departure) in an eight day holiday. Air fare is included through Atlantic Coastal Charters at the Sunny South Building next to the main terminal at Ft. Lauderdale International Airport. The charter leaves at 8:30 am and you can be heading out for your first dive at 11:00 am. An overnight stay in Ft. Lauderdale the night before can be arranged. The closeness of Bimini allows for an excellent long weekend dive pack-

age as well. Photographers will be pleased to know that Watson has installed an E-6 color lab and overnight slide processing available.

Bimini's time has come and Undersea Adventures offers a professional package at a very competitive price. For information contact: Bimini Undersea Adventures, P.O. Box 4960, Ft. Lauderdale, Florida 33338; (Florida) (305) 763-2188, (out of state) (800) 327-8150.

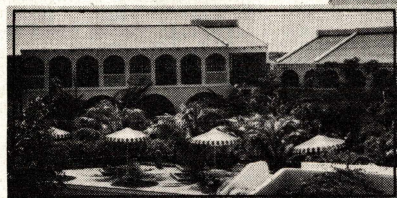
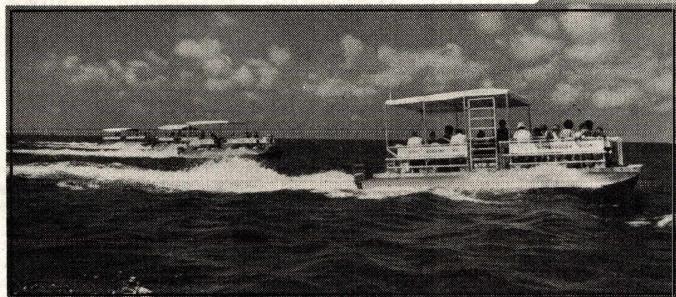
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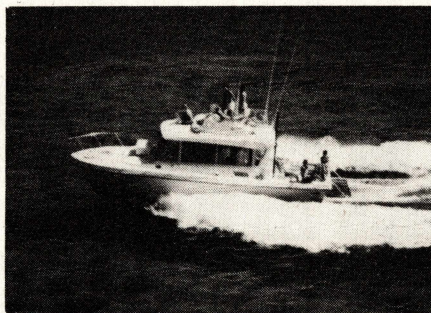
Dee Scarr, creator of the Touch the Sea program of personalized dive guiding on Bonaire, is offering the PADI distinctive specialty rating of Touch the Sea. This certification program consists of three dives with Scarr plus related discussions. During certification programs divers experience tactile sensations in the sea, stroking scorpionfish and even hand feeding a peacock flounder.

Single Touch the Sea dives are still available.

Scarr's programs are available to divers on Bonaire, especially through Cap'n Don's Habitat and Bruce Bowker's Carib Inn. Additional information about the programs can be obtained by writing (via airmail, please) to Dee Scarr, c/o Touch the Sea, Bonaire, Netherlands Antilles.

REEF ROAMER

A new dive boat, *Reef Roamer*, has been brought to Belize, and its operators, Out Island Divers, now offer more trips to Lighthouse Reef and Half Moon Cay. Based on Ambergris Cay, the *Reef Roamer* is a 37 foot, twin diesel, fiber-



glass vessel equipped with generator, galley, head, and portable compressor. She is capable of 16 knots under full load. Smaller groups of four divers may live aboard, while larger groups of 16 divers can be lodged on Ambergris Cay and make overnight excursions to Lighthouse Reef to camp on Half Moon Cay.

Out Island Divers offers flexibility in its dive packages, with a variety of hotels to chose from.

For further information contact: Sport Tours, 305 Alcazar Ave, Miami, FL 33134; phone (305) 448-4385.

SCUBA TOBAGO

Scuba Tobago now offers upgraded accommodations in Tobago's Mount Irvine Bay hotel, in addition to reasonably priced accommodations at the Sandy Point Beach Club. The package, at either hotel, includes: eight days/seven nights air-conditioned accommodations with private bath; roundtrip transfers between

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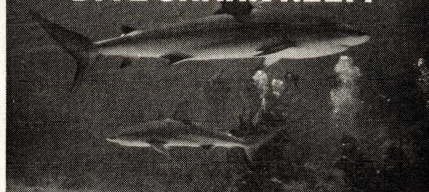


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airport and hotel; welcome cocktail party; and a series of five dives, with transportation, boat, air, guide, tanks and weights. In addition, divers on the package receive complimentary Scuba Tobago T-shirts and a one year membership in the Cousteau Society. Also available is a 12 dive package. Roundtrip GIT package air fare from New York, via BWIA, the national carrier, is \$299. GIT \$299 airfare is also available on American Airlines. Both offer daily direct service from New York.

Diving is under the direction of Jim Young, owner-operator of the Dive Tobago shop. The package allows divers taking certification courses in the states to make their open water dives at no extra charge (with a letter from their instructors). Both resort and certification courses are available from the Youngs, as are night dives for divers who bring their own lights.

For further information, contact your travel agent, local scuba shop, or Evacar Travel (the packager) at 25 West 43rd Street, New York, NY 10036; phone (212) 354-8303, or the Trinidad & Tobago Tourist Board, 400 Madison Avenue, New York, NY 10017; phone (212) 838-7750.

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See & Sea Travel of San Francisco is offering a series of medical seminars. Medicine in the Aquatic Environment: Basic and Applied Aspects, will provide the latest scientific and clinical information on diving-related conditions such as dysbarism and hypothermia, hazardous marine life and other topics.

The first four programs announced for 1983 are: Belize (aboard *Isla Mia*) February 26-May 8; Philippines (aboard *Seaquest*) April 23-May 8; Truk Lagoon/Ponape (hotel-based) July 24-August 8; Cayman Islands (aboard *Cayman Diver*) October 8-15.

Future programs will be announced for the Galapagos, Palau, Maldiv Islands and other See & Sea destinations.

Medicine in the Aquatic Environment is approved by the American Medical Association through the Undersea Society for 26 continuing Education Category I credits. Director of the program is Dr. Ken W. Kizer, and associate director is Dr. Paul Auerbach.

For further information on these medical seminars contact See & Sea Travel Service, 680 Beach Street, San Francisco, CA 94109, telephone (415) 771-0077.

ROWE PUBLISHING

Publisher Alan R. Rowe recently formed the Rowe Publishing Corporation. The Diver's Bookstore (formerly Rowe Publications) and Aquatronics are now divisions of this international organization.

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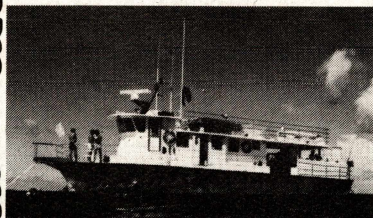
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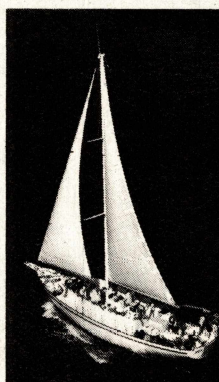
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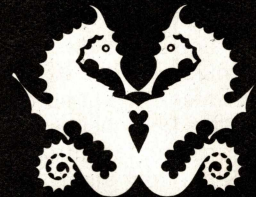
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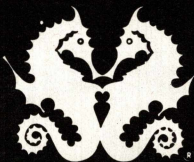
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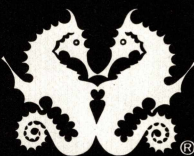
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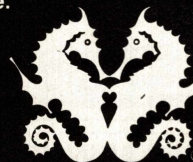
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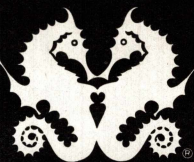
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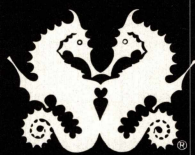
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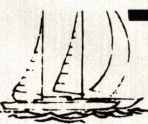
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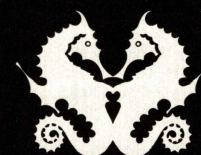
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AQUATIC CENTRES

The Aquatic Centres dive shops, operated by George and Luana Marler in Road Town, Tortola have taken over management of the 44 foot sailing yacht, *Priority*. Both bareboat and crewed



charters and special off season rates are available for the vessel.

Aquatic Centres has installed a new computer system which links the shops with the stateside office of J. W. Pepper. This system allows daily transmission of reservations between the office and shops.

Divers can make use the system for reservations by calling (800) 345-6296 (in Pennsylvania (800) 362-2555). The Aquatic Centres can be contacted by mail at P.O. Box 108, Road Town, Tortola, BVI.

KLEM CHARTERS

Steve Klem, a 34 year veteran of Florida Keys diving, is again offering all day charters after an absence of three years.



Now that his underwater film is complete he's back diving in Pennekamp.

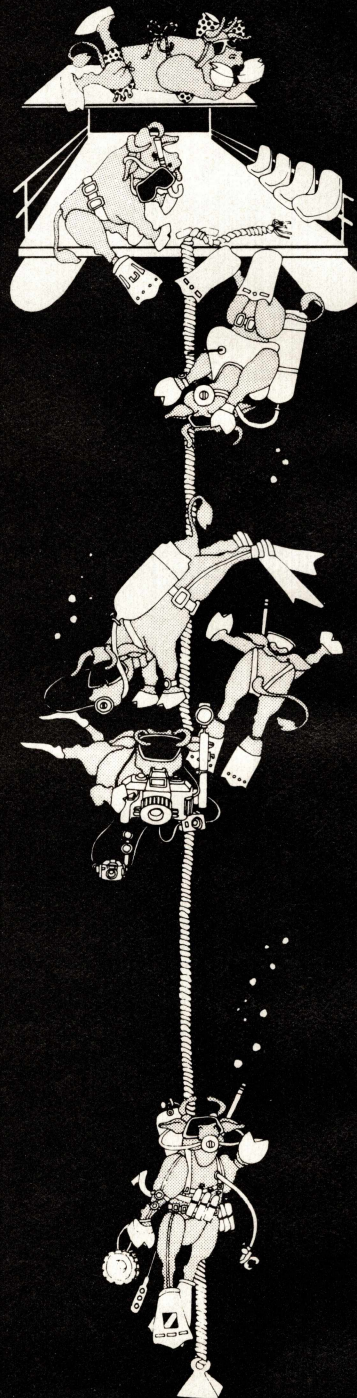
For further information and reservations, write or call Steve Klem, P.O. Box 1803, Key Largo, FL 33037; (305) 451-1831.

OCEANQUEST/WALKER'S CAY

OceanQuest, Inc. has added Walker's Cay in the Bahamas to its dive travel itinerary. According to Frank T. Shane, OceanQuest president, "After months of research, we have selected Walker's Cay as our prime Bahamaian destination."

Walker's Cay is managed by David O' Shaughnessy. The 100 acre island is a self-contained resort, complete with its own marina, efficient customs service,

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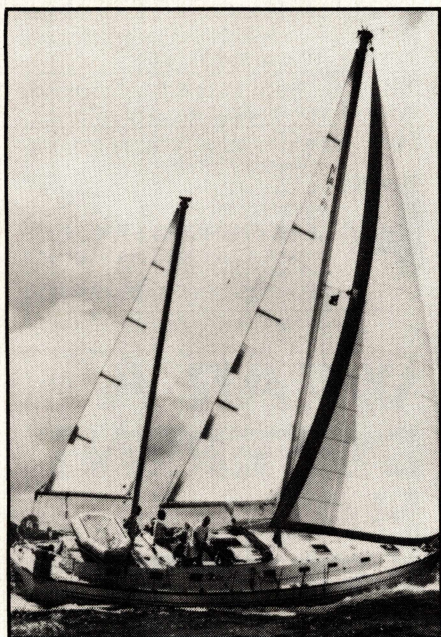
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airline and 62 room hotel. The modern dive operation is directed by Cheryl Kirz.

OceanQuest's computerized reservations make booking easy, including air fare from your city of departure. There is no extra cost to use this convenient service. For a limited time, OceanQuest travelers can save over 15 percent on all diver and non-diver packages booked to Walker's Cay. Groups are also commissionable, and with ten paid, the eleventh is free. To make reservations, call OceanQuest toll-free nationwide at (800) 526-1394, or in New Jersey (201) 744-5254. ✕

SEE & SEA/VIRGIN ISLANDS

See & Sea Travel Service now offers a Virgin Islands diving program aboard the 46 foot *Carriba*. The boat can operate for as few as two divers and as many as six. Her itinerary will originate in St. Thomas



and range over the best dive sites of St. Thomas and the British Virgin Islands. During good weather she will even take divers to Anegada Reef.

These personalized, dive programs are ideal for couples and families. For further information contact: See & Sea Travel Service, Inc., 680 Beach Street, San Francisco, CA 94109. ✕

DIVERS' FLEA MARKET

The Divers' Flea Market, sponsored by the Submersibles Club at Southampton College of Long Island University, will be held at the Southampton College Gymnasium on Sunday, October 10, from 10:00 am to 5:00 pm. This will be the sixth Divers' Flea Market to be held at the college.

Admission is \$1 for the general public; children under 12 are admitted free. Proceeds are used to support Submersible Club activities. ✕

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- ___ Elbow
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NAVY DIVER

(Continued from Page 15)

slowly tumbled another 90 feet down the slope. With his hose wrapped several turns around the outside of the fuselage, Bob made a decision to cut his umbilical and make a 180 foot free ascent. Venting out the expanding air within his lungs, he arrived at the surface without any ill effects.

For the next few days, he and his companions managed to recover all but \$300 of the money aboard the Constellation. Representatives of the Treasury Department were on hand to take delivery of the cash.

Being the kind of individual who is obsessed with getting a job done quickly, Bob once refused to stop working after his scuba regulator malfunctioned during the recovery of an Army Caribou cargo plane. Wanting to avoid a repetitive dive to 85 feet, he chose to buddy breathe with his partner while they completed the task of connecting hoisting cables to the aircraft.

Bunyan is a man who has seen his share of death. During his career he has recovered over 60 bodies from the wreckage of various accidents at sea. The full extent of his unusual experiences are far too diverse to talk about in the limited space afforded me here. The first diver to change a propeller on a nuclear submarine while submerged, Bob Bunyan is one of a rare breed—one who has helped pave the way in the field of diving.

Bob now lives the easy life, devoid of the hazards to which he was once accustomed. He exhibits the contented, self-satisfied manner of a man who has lived in the fast lane and taken all the risks it offered. He has lived more in a 22 year span than most people could possibly experience in ten lifetimes. He is one of the few to have walked the tightrope.

HABITAT RESERVATION MANAGER

Jan LaMont has been appointed U.S. reservations and administrative manager for the Habitat in Bonaire. LaMont will be responsible for coordinating the administration of the reservation office under the direction of Frank Fennell.

Habitat is an informal "cottage style" hotel specifically designed for divers. A full service dive shop and four Flattop boats are among the facilities available for use by guests.

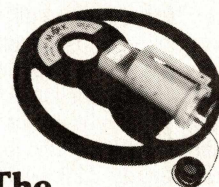
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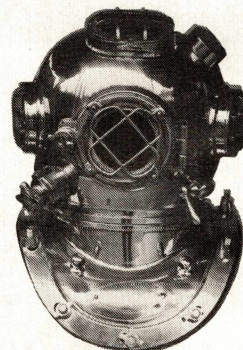
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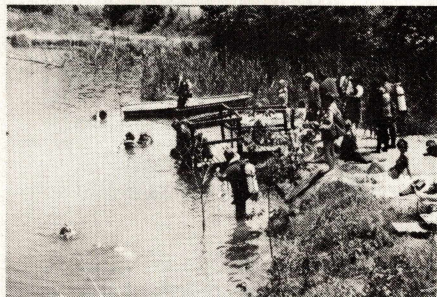
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MIDWEST TREASURE HUNT

On June 20 Aqua-Nut Divers of Clinton, Indiana held its Annual Treasure Hunt & Membership Drive. In the springfed waters of Horseshoe Lakes Campground, St. Bernice, IN, divers searched for



markers. The number of the marker found determined the order of draw for prizes. Each prize or prize package was valued from \$10 to \$730.

For further information regarding the Treasure Hunt or a list of prize winners, contact: Aqua-Nut Divers, R.R. #1 - Box 360, Clinton, IN 47842; or call (317) 832-9930.

NIKON PHOTO CONTEST

The Nikon Photo Contest International (NPCI) '82/'83 is now accepting entries from professional and amateur photographers. A trip to Japan heads the list of 163 valuable prizes.

Each entrant may submit a maximum of five entries for each of the contest's two categories—black and white, and color. Only photographs taken with a 35 mm camera will be accepted.

Entry forms and rules may be obtained from Nikon camera dealers nationally, or by writing NPCI, Entry Form, Nikon Inc., P.O. Box 307, Garden City, NY 11530. All entries must be submitted no later than October 31, 1982.

ADVENTURE DIVERS

Adventure Divers, owned and operated by Sam Rich, NAUI instructor, is offering a complete training program in conjunction with Holiday Health Clubs.

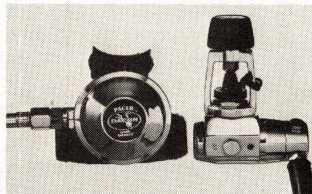
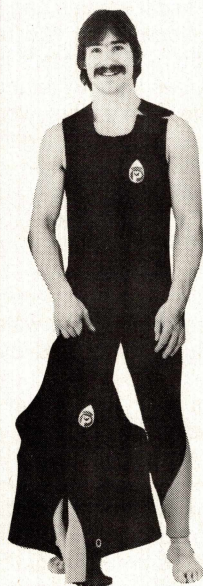
Adventure Divers, in Ft. Lauderdale, FL is a fully equipped NAUI educational facility. It offers NAUI sanctioned courses from basic certification to assistant instructor. Complete classroom and pool facilities are available, and the company's excursion van is specially equipped for camping and group trips to all destinations in Florida.

Holiday Health Clubs offer racquetball, indoor jogging tracks, complete fitness training, swimming classes, and an olympic-size pool.

Adventure Divers is the exclusive training agency for all 11 Holiday Health Clubs and will offer all existing members a complete training program, special discounts and group excursions. All levels of certification will be taught at the executive club located in Ft. Lauderdale.

New England Divers October Super Savers

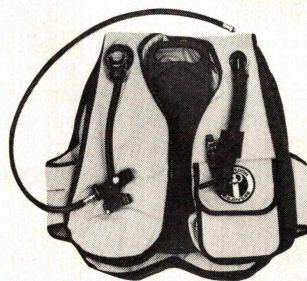
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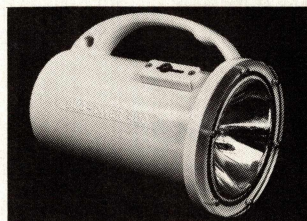
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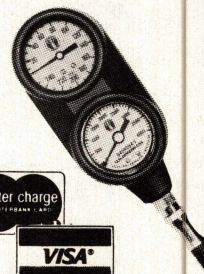


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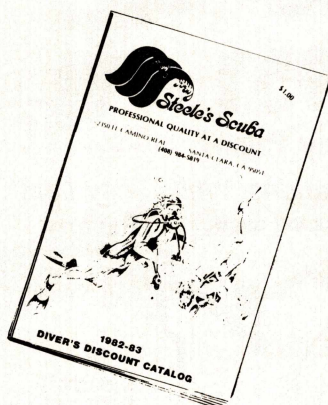
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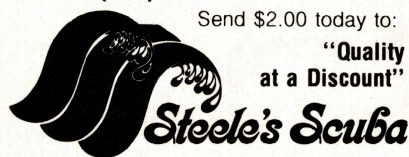
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OCEAN CORPORATION

The Ocean Corporation has become the largest commercial diving school in the world. During the fiscal year ending in March 1982 Ocean Corporation had revenues of \$1.2 million, a 57 percent increase over the previous year. A total of 369 entry-level commercial divers were graduated from the basic air/mixed gas/bell diver training programs, 134 of whom attended the five week Diver Medical Technician (DMT) and/or the NDT (Non-Destructive Testing) elective courses. The Ocean Corporation is the only commercial diving school offering ASNT Level I and II training in underwater ultrasonics, magnetic particle and dye penetrant NDT techniques.

The most important performance statistic during the year, however, was the fact that Ocean Corporation achieved 100 percent job placement for all graduates. Expansion and improvement plans for 1982 include starting up the new surface NDT technician and commercial scuba diver (CSD) training programs, increasing DMT training courses from five to ten per year, and introducing actual helicopter evacuation training in the DMT courses. The Ocean Corporation is also expanding its nuclear power plant diving services group and will provide project management services for an upcoming dive series on the legendary luxury liner *Lusitania*.

HALLOWEEN DIVE

Ocean Divers of Key Largo will hold its Second Annual Great Pumpkin Dive, October 29-31. There will be treasure dives, a costume competition and a cook-out.

For more information contact: Ocean Divers, Inc., P.O. Box 1113, Key Largo, FL 33037; phone (305) 451-1113.

COSINA LENSES

Cosina America, Inc. is introducing a full line of lenses made to fit other major brand cameras. The new line, called the E.T./Series 10, also carries the first 10 year limited warranty ever offered by any lens manufacturer.

E.T./Series 10 models will be available in a wide range of focal length and variable zoom capabilities. Each will be available with a high-quality metal bayonet mount specifically designed to fit Nikon, Canon, Pentax, Minolta or Olympus cameras.

Cosina Limited provides optical glass for a number of camera and video equipment manufacturers. Cosina America, Inc. produces a broad line of cameras, lenses and accessories which are marketed under its own name. U.S. corporate headquarters are located at 3669 W. 240th St., Torrance, CA 90505.

The First 35mm Camera with Autowinder to Reach Depth of 160 ft

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KELP COMEBACK

Once a week this summer, half a dozen or so members of the Caltech Dive Club could be seen anchoring a small boat off Point Vicente on the Palos Verdes Peninsula in Southern California. The volunteers spent their time underwater either bashing hundreds of kelp-destroying sea urchins with small hammers, or fastening young kelp plants to rocks with circular slices of tire inner tubes.

"It's the underwater equivalent of clearing a garden of snails," said Gordon Stewart, a participant in the project. "It's hard work, but we feel like we're giving something back to the ocean, after having enjoyed it so much in sport diving."

Under the supervision of the California Department of Fish and Game, the dive club embarked last April on a project to clear a 100 yard square tract and establish a thriving kelp bed in an area that has been denuded for some 30 years. The project is part of the Department of Fish and Game's ongoing efforts to reestablish kelp beds in Southern California. Project leader for the state effort is marine biologist Ken Wilson, and training the Caltech divers is marine biologist John Grant. The divers' boat was supplied by the U.S. Coast Guard Auxiliary.

LACKEY/IMPERIAL

Imperial Manufacturing has appointed Vinton Lackey vice-president of manufacturing. "Vinton Lackey will help Imperial move from a piece work operation to a more cost-effective production line manufacturing mode," said Nik Salmela, president of Imperial. "His management experience will improve our focus on the manufacturing process."

SHARK RECIPES

The West Coast Fisheries Development Foundation has some delicious recipes using shark, as part of the Seafood USA campaign launched in July.

Seafood USA, according to executive director Pete Granger, is part of an education and marketing program established in 1981 to increase consumer awareness and consumption of fish and other seafood products.

For more information on the Seafood USA campaign or recipes, contact Pete Granger, West Coast Fisheries Development Foundation, 812 S.W. Washington, Portland, OR 97205; (503) 222-3518.

SCUBA DUBA DIVE MOVES

Scuba Duba Dive, after 21 years in Studio City, CA has moved to a newly decorated 6000 square foot store. Jim and Pat Ashenbrenner, with their three sons, Scott, Mitch and Glenn, operate this well-stocked store at 7126 Reseda Blvd., Reseda, CA.

Scuba Duba Dive Specializes in sales and instruction with special emphasis on semi-private classes.

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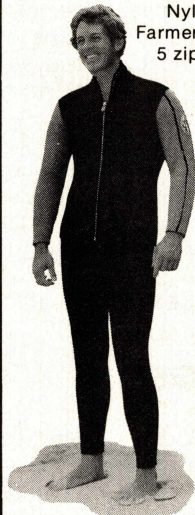
U.S. DIVERS' Calypso VI **119⁹⁵**

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Add \$3.00 shipping for each Regulator

Nylon Two Wet Suits with Farmer John pants. 1/4" Nylon Two. 5 zippers Sizes — S,M,L,XL.



OCEAN APPERAL **139⁹⁵**

PARKWAY OMNI **149⁹⁵**

U.S. DIVERS' SEA DIVER II
Black w/ yellow accent stripe.
Blue w/ silver accent stripe.
149⁹⁵

Add \$4.00 shipping for each Wet Suit ordered.



BC JACKETS

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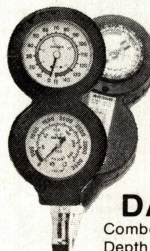
Complete with power inflator

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SEACHUTE by DACOR **189⁹⁵**
With power inflator

CAYMAN I, II by PARKWAY **149⁹⁵**
With power inflator

Add \$4.00 shipping for each BC Jacket ordered



GAUGES

DACOR IC3-150 **89⁹⁵**
Combo CPG, Oil Filled Depth Gauge & Compass

DACOR ICL-150 **79⁹⁵**
Combo CPG and Oil Filled Depth Gauge

FARALLON Navigator's Console **69⁹⁵**
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1-800-241-1856
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Prices apply only to orders placed by mail or telephone and may vary from those in our store. Use and operation of life support equipment should not be undertaken without qualified and proper instructions in their use. This ad does not imply the sale of life support equipment through the mail.



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Nylon I 1/4" Warm Water Hood .	10.95
Nylon II 1/4" Hard Sole Boots ...	15.95
Nylon II 1/8" 5 Finger Long Cuff Gloves	16.95
Nylon I 1/8" Vest With Hood	27.95
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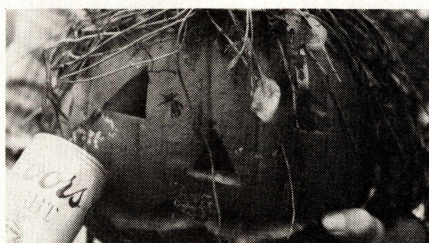
Dealer Inquiries Invited



U/W PUMPKIN CARVING

The Indiana Skin Diving Council and the Aqua-Nut Divers Scuba Club are co-sponsoring the Second Annual Underwater Pumpkin Carving Contest. This year's event will be held at Horseshoe Lakes Campground in St. Bernice, IN beginning at 2:00 pm on Sunday, October 10.

There will be an entry fee of \$2.50 for ISDC members and \$5 for non-members. Prizes will be awarded in five categories:



First to finish, most original, ugliest, best looking, and closest estimate to completion time (no watches allowed). One of the top prizes to be awarded is a buoyancy compensator from Tabata, USA. A cook-out will follow the dive.

For further information or pre-registration contact: Indiana Skin Diving Council, c/o Greg Brock, President, 927 Walnut St., Clinton, IN 47842; (317) 832-7420. Or contact: Aqua-Nut Divers, c/o Joe Chambers, President, R.R. #1 - Box 360, Clinton, IN 47842; (317) 832-9930.

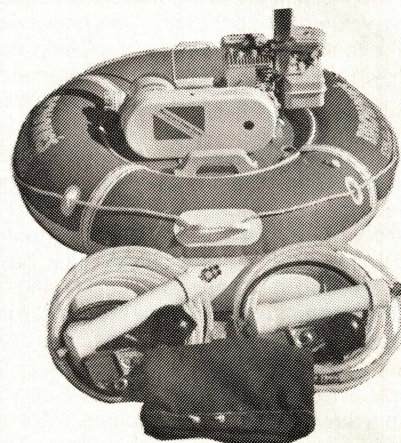
SAFETY AND RESCUE PROGRAM

The Los Angeles County Underwater Instructors Association is offering an intensive training course in the techniques of diving safety and rescue. The purpose of this program is to train participants in safer diving practices by exposing them to, and developing solutions for, common causes of diving accidents such as: errors in judgement, misuse of equipment, stress, fatigue, panic, etc. Graduates should benefit by being safer divers themselves, by being qualified to assist groups in dive planning and execution, and by serving as capable rescue divers on group outings.

The course will be held from 8:00 am to 2:00 pm on each of six weekend days (October 16 & 17, 23, 30, and November 6 & 7). It will involve extensive training (through lectures and in-water experiences) in the recognition of potential accidents, their prevention, and their management, including: first aid, rescue methods and skills development, rescue agency coordination, missing diver procedures, etc.

The fee for this program is \$50. For further information contact Mary or Ben, at the County's Southern Regional Sports

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For free catalog write P.O. Box 290357, Ft. Lauderdale, FL 33329 in U.S., PR., VI., call: (800) 327-0412. FL. Res. (305) 584-5570.



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Yellow or Blue
38 Lb. or 52 Lb. Lift
Low Pressure Inflator

BC 700 \$119

U.S. DIVERS SEA OTTER

1 year warranty.
Yellow or Blue.
43 lb. or 55 lb. lift.
L.P. inflator & hose.
Deluxe Kam-pac.

SEA OTTER \$149

CENTRAL'S "SELL-A-WAY"

If you are thinking of buying at least \$50.00 worth of diving equipment, Central has a deal for you. Would you buy an underwater watch for \$5.00? How about a 7" diving knife for \$5.00? Could you use a wet suit for \$5.00 or a rechargeable light for \$5.00? Central is having a "Sell-A-Way" where everyone who buys \$50.00 or more can purchase one of these or other valuable items for only \$5.00. Please send immediately for your 48 page catalog, "Sell-A-Way" rules and Diver Flag Decal, all for \$1.00.



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Write for catalog \$2.00 (\$3.00 foreign)
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(305) 887-8726

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Office, 419 East 192nd St., Carson, CA 90745; or phone (213) 327-5311

UCSD PHOTO COURSES

Marine photography courses for the public are offered this fall by UCSD Extension, the continuing education arm of the University of California in San Diego. These include Tide Pool Photography, to be held from 7-10 pm Tuesdays, Oct. 5, 19, and Nov. 2, 16 and 30 plus five weekend shooting sessions to be arranged according to tide and weather patterns. Classroom sessions will be held in Room 111 of the psychology and linguistics building at UCSD. The fee is \$225 and the instructor is James Beckett, a professional photographer and former underwater photography instructor at the PADI International College, Inc.

For more information on marine photography classes offered by UCSD Extension, call (714) 452-3400 and ask for the free Explore catalog.

STEWART/PADI INT. COLLEGE

Dana Stewart, PADI master instructor and course director for instructor training, has recently been promoted to the position of director of training. Stewart has an extensive background in teaching all of the PADI college diving specialties.

Stewart is a water safety instructor, first aid instructor and CPR instructor. He is the college liaison with the University of California, law enforcement agencies, the life guard services, and federal agencies in coordinating the college's curricula in rescue, search and recovery and research diving. He has also been instrumental in putting together the college's equipment repair technician course.

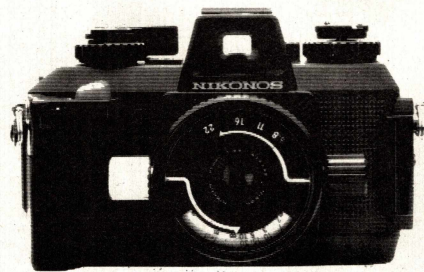
INSTRUCTOR MERIT AWARD

PADI is offering a new Instructor Merit Award, aimed at encouraging and recognizing individual PADI members who put forth an outstanding effort in promoting quality diver education. Instructors who apply for this award will be evaluated on such areas as their overall level of professionalism, expertise, student rapport, promotion of continuing diver education, and contributions to the dive community.

Instructors who meet all of the qualifications for this award will be announced quarterly in PADI's Undersea Journal and Dive Industry News, and will receive a newly-designed bronze medallion or lapel pin. In addition, they will be eligible to be nominated for PADI's International Distinguished Service Award. This is presented annually to one instructor from each of PADI's international branches and domestic regions.

Additional information and applications for PADI's Instructor Award Program are available from PADI Headquarters, 1243 E. Warner, Santa Ana, CA 92705.

The best in underwater photo equipment for less.



Nikonos IV with 35mm
f2.5 lens. \$ 299.00

Nikonos IV body only \$ 229.00

Nikonos lenses:

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Nikonos Close-up Outfit—

includes supplementary close-up lens,
field frames for three lenses (28, 35,
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Nikonos Speedlight SB-101 underwater
electronic flash w/o case . . \$ 329.00

Eumig Nautica Silent Super-8 camera
with 9-30mm f1.9 zoom lens
(18fps) \$ 269.95

Eumig Nautica Silent Super-8 camera
with 9-30mm f1.9 zoom lens
(24fps) \$ 339.95

Helix Aquafash 22 includes mounting
tray and connector cables . \$ 299.50

Ikelite SubStrobe 150L underwater
electronic flash w/o charger \$ 399.95

Ikelite SubStrobe M. \$ 145.00

Subsea MK 150 battery-powered
strobe (EO) \$ 464.95

Sunpak Marine 32 underwater elec-
tronic flash: includes strobe, tray,
and diffuser \$ 289.50

Toshiba TM-2 underwater elec-
tronic flash. \$ 169.00

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housing \$ 250.00

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Amphibian camera. \$ 99.95

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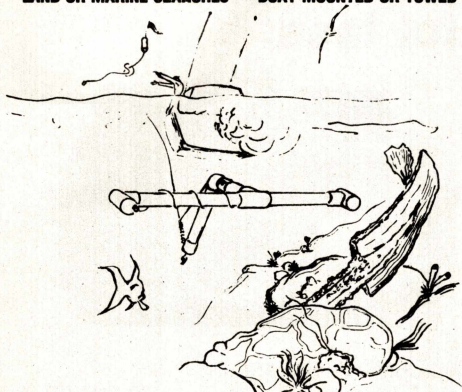
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THE BEST-KEPT, MARINE MAGNETOMETRY SECRET: most of the time the main reason for towing the complicated cable + fish rig found in 1 sensor-location, digital mags is not to get close to the search object ... not even to avoid the magnetic influence of the boat since that's either constant or gradually changing ... the reason is to avoid the engine's electromagnetic, noise spikes masquerading as groups of proton precessions (23.5 gammas of error per false precession) — Why are 2 sensor-location mags replacing 1 sensor-location mags? Send for free brochure or send \$1 (\$2 foreign) for complete info — or send for new book Searching with 1 and 2 Sensor-location Magnetometers, 55,000 words, 40 figures, \$19 (\$25 foreign) — foreign quotes \$2 — Compare prices, hard data, chart readouts, lab or field gamma sensitivities (or target sensitivities) — 10 to 235 times greater than mags costing 5 to 10 times our prices — Archaeology, salvage, treasure, placer gold + magnetite or blacksand (settles in ancient or modern stream pockets).

Detects 1 lb steel at 20 ft, 64 lb at 80 ft, 2 tons at 320 ft, 125 tons at 1280 ft — recorder, earphone, loudspeaker, meter modes simultaneously or individually — M. L. Dalton Research, 6035 Aberdeen, Dallas, Texas 75230 — Phone (214) 691-4925 — Phone not always attended so call nites & weekends too, avoid early AM.

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Unique Gift



This beautiful pendant was actually salvaged from a sunken galleon of the 1715 Spanish treasure fleet! The majestic ships were treasure laden and homeward bound when they were dashed on the reefs of Florida in the midst of a raging hurricane. In recent years, much treasure has been recovered but few pieces rival this unique artifact in beauty and elegance. We have reproduced it in 24k Gold Plated Sterling Silver for your enjoyment.

ACTUAL SIZE

\$12.95 each [plus 1.50 shipping]
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GUARANTEE: Satisfaction or return within 14 days for a full refund.

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Please send me _____ Pendant(s). Enclosed is \$12.95 (plus 1.50 shipping) for each pendant. Total enclosed \$ _____

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

JOINER GETS HOFFMAN AWARD

James T. Joiner, executive director of Commercial Diving Center in Wilmington, CA has been awarded the 1982 Craig Hoffman Memorial Safety Award by the Undersea Medical Society.

Awarded annually to the person who has made a significant contribution to dive safety or enhanced the safety of deep sea diving, the Craig Hoffman Safety Award was established in 1977.

Joiner has over 15 years of experience in the dive industry including training, education, safety and facility development and management. He is active and well known in all aspects of diver training and the dive industry including the design and development of a diver/medic training course. Joiner directs the activities of Commercial Diving Center which is the Oceaneering International, Inc. training facility for professional divers.

WASHINGTON STATE SPORT DIVING COUNCIL

The Washington Council of Skin Diving Clubs has, after 23 years, become the Washington State Sport Diving Council.

The Council's emphasis has been toward projects which enhance all sport diving activities, including accident investigation, safety, diver education, development of new underwater marine parks, enhancement of existing underwater marine parks, monitoring of state and federal legislation possibly affecting sport diving, hosting of statewide photography contests, and to serve as a sounding board for dive clubs and individuals throughout Washington state.

The Council is a non-profit organization and seeks support from all persons connected with the dive industry. Anyone interested in contacting the Council is encouraged to do so at: Washington State Sport Diving Council, P.O. Box 546, Seattle, WA 98111.

UNDERWATER HAUNTED HOUSE

The Aqua Amigos Scuba Club of Cleveland, Ohio will host its Eighth Annual Underwater Haunted House and Halloween Party at Nelson Ledges Quarry, October 16.

The event is \$5 for divers and \$2.50 for non-divers; cider and doughnuts are included. For information call Joe Pleichner at (216) 383-5236 or (216) 731-2522.

BUDDY LINE

The Scuba Shops of Baltimore and Garrison, Maryland are operating a buddy matching service for divers in those areas. The Buddy Line was inspired by



SKIN DIVING ACCESSORIES WHOLESALE PRICES TO PUBLIC

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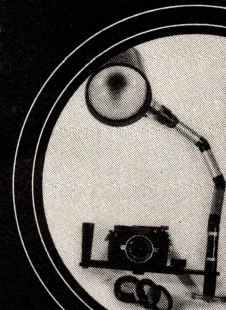
CASIO

DIVERS WATCHES SUPER DISCOUNTED

- W300** NEW! Waterproof 300 ft./alarm with countdown/stopwch/7 yr. batt. **\$29.00**
- DW280C** NEW! Waterproof 600 ft./alarm with countdown/stopwch/7 yr. batt./stainless steel case/resin band **\$39.00**
- DW-280** NEW! Waterproof 600 ft./alarm with countdown/stopwch/7 yr. batt./all stainless steel **\$46.00**

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GUARANTEE AND R.B. ATHLETIC SYSTEMS
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
Hydro Photo



- Close-up Lenses for Nikonos 35 and 28mm
- Wands-Framers
- Cobra Flash Arms

For free catalog write: Hydro Photo
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(206) 437-2405

the high dropout rate among new divers and by the frustration people often experience when planning a dive but being unable to locate a buddy. Divers simply call or visit either of the shops and leave their names, primary U/W interests (photography, spearfishing, etc.), phone numbers, and when they are available to dive. When a diver needs a buddy, the Buddy Line can provide the name and number of a likely candidate.


For further information contact: the Scuba Shop II, 7976 East Baltimore St., Baltimore, MD 21224; (301) 285-6454, or Scuba Shop III, 9635 Reistertown Road, Garrison, MD 21055; telephone (301) 363-1320. 

AQUARIUS SPECIALTY COURSES

Cincinnati dive instructor, Leesa Wiesner, has developed several new specialty courses. Wiesner and the staff of her Aquarius Dive Shop have enlisted the skills of Cincinnati Zoo curator of education, Barry Wakeman, to set up a series




of classes in marine biology and limnology. The PADI sanctioned classes range from informal lectures and discussions to field trips to local ponds and streams, all with an emphasis on student participation.

For more information, write or call: Leesa Wiesner, Aquarius Dive Shop, 800 Elm Street, Ludlow, KY 41016; (606) 431-8626. Or contact: Mark Schlachter, 5923 Rapid Run Pike, Cincinnati, OH 45238; (513) 941-7332. 

PADI SAFE DIVING PRACTICES

A uniform set of PADI Safe Diving Practices, aimed at increasing individual diver awareness of personal responsibilities in maintaining diver safety, has been introduced by PADI. These have been incorporated into all PADI diver training materials, ensuring that newly-certified divers have a clear understanding of the conduct expected of them as members of the sport diving community.

Developed through input from dive resort and charter boat operators, instructors, and dive store owners, the Safe Diving Practices are available in the form of a statement of understanding which can be used by groups or individuals to establish a common standard of practice for divers during organized dives and activities.

Copies of the PADI Safe Diving Practices are available for \$1 from PADI, 1243 East Warner, Santa Ana, CA 92705. 

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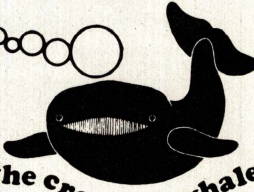
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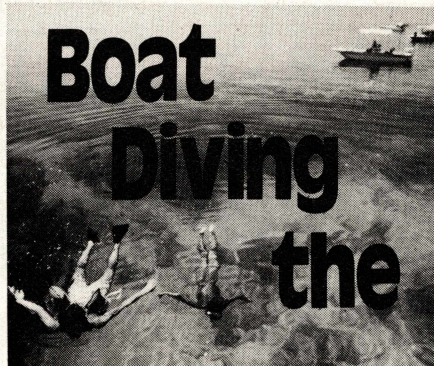
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Boat Diving the Florida Keys

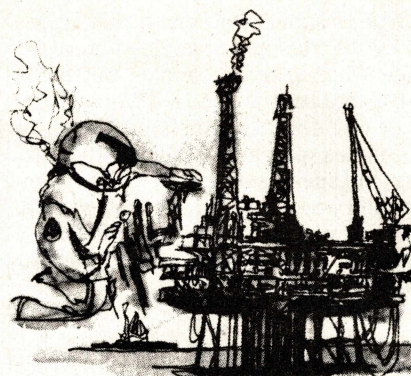
**TEXT AND PHOTOGRAPHY
BY JOHN E. MACNINTCH**

To the boating-oriented scuba diver a trailerable boat can provide a passport for a most enjoyable vacation in the sparkling, clear waters of the Florida Keys: A vacation with unlimited diving, relaxation with family and friends, unrestricted by the hassle of group diving expeditions. Florida Keys diving has been aptly described as domestic diving with a Caribbean atmosphere, as the plethora of beautiful tropical fish and coral testifies. The Florida Keys, especially when accessed by a diver in his own boat, has much more to offer than the majority of divers realize.

I visited the Florida Keys for the first time in the mid '60's and had my first taste of diving on these beautiful reefs. I swore to return one day with my own boat to enjoy these tropical waters.

The ocean waters of the Florida Strait, which lie between the Florida Keys and Cuba, are the most exotic waters bordering the continental United States. Here, the warm flow of the Gulf Stream comes closest to land, lending warmth and clarity. During summer months the winds are calmest, the water is warmest and the diving is at its best. Water temperature ranges between 85-89°F during July and August and air temperatures seldom go above 85-90°F. On some days the ocean lies completely subdued and flat as a sheet of glass. Under the surface, large schools of grunts and snappers congregate beneath the shelter of elkhorn coral branches, so tame you can almost touch them. Yellowtail snappers and brightly colored sergeant majors dot the water, looking for a handout. Graceful queen angelfish follow you like tame dogs. Clouds of copper sweepers stick to shady sanctuaries and everywhere brightly hued parrotfish crunch the coral with their beak like mouths.

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most fringe of coral development and contain over 40 species of coral and over 600 species of fishes. In no way is this wonderful world more experienced and appreciated than from the privacy, flexibility and convenience of your own boat.

For the past four years I have visited



the Florida Keys towing first a 17 and then a 20 foot boat behind a mini motor-home. I have driven the more than 3200 miles round trip from Upper New York State to dive these waters during the month of August when lobster are in season. Motels are plentiful and campgrounds on the water are not difficult to find. Also local stores provide a wealth of information in the form of dive site booklets and NOAA charts, water depth and aids to navigation. Pennekamp Park, which has good camping facilities, sells an inexpensive chart indicating compass bearings to the main dive sites and the dive shop posts information daily on water visibility, temperature and wave height out on the reef. Although these reefs are five to seven miles offshore, popular dive sites are relatively easy to locate. Some reefs, such as Molasses, Carysfort, Sombrero and Alligator, are marked by large light towers, visible for many miles distant. It is advisable to have a compass, however, as one does get out of sight of the low-lying land at times and, visibility is reduced during local thunder showers which are not infrequent during summer afternoons.

Boating to dive sites on the waters of Florida Strait is unlike boating on most ocean waters because waves are very seldom sizable enough to pose a threat to craft of 16 feet or more. Fourteen foot boats are commonly found anchored over the reefs with their dive flags flapping in the breeze. During the summer months winds are seldom more than 10-15 knots, usually from an offshore quarter, giving rise to a light chop inside the reef and a one to three foot swell on outside waters. One has to keep an eye out for local thunder storms and squalls, however, and tropical storms or hurricanes always pose a threat during the summer and autumn months. But, these disturbances are usually spawned off the coast of Africa and ample warning is given. If you run into engine trouble within the confines of the park the Park Patrol boat will come to your assistance and

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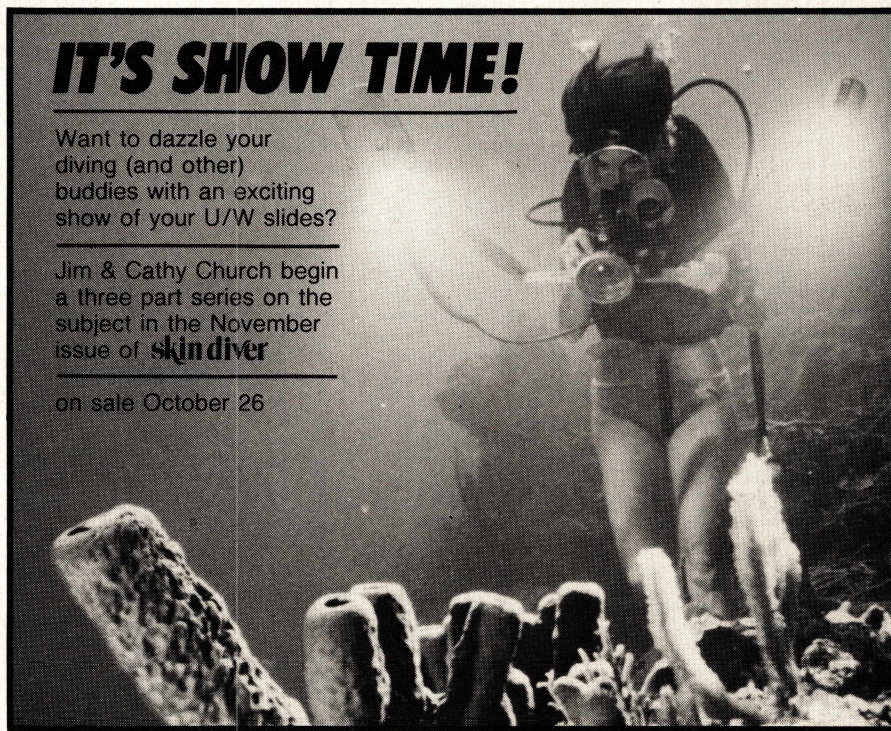
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FLORIDA KEYS

there usually are many other boats which will help. If you have never dived or boated in these waters it is advisable that you take at least one dive shop excursion initially to get oriented.

The ideal trailerable dive boat is one of 17 feet or more in length, equipped with a swim platform, boarding ladder, depth finder, compass, at least one good anchor of suitable poundage (such as a Danforth) equipped with a chain. I prefer a stern anchor in addition for safety purposes as it is a long swim to shore. Also needed are adequate safety equipment including flares, a CB or radiotelephone, a first aid kit and a dive flag. There should be adequate space for scuba cylinders, people, food, drinks and gear. A bow rider offers the most efficient use of space.

One must remember to be careful and not damage coral when anchoring on a reef. Seek out the sand patches between coral fingers and lower the anchor slowly so as not to hit any divers who might be swimming below your boat. Always proceed very slowly when approaching a dive site and post a lookout to watch for the telltale bubbles of divers.

After a series of good dives on the reef it is fun to locate patch reefs and coral gardens and to search for lobsters. Florida lobsters have no claws and it is possible to get them in water as shallow as six feet deep. Use gloves to protect you from the spines. Catching lobsters by free diving is a real challenge but the use of tanks makes it somewhat easier. Lobsters may be taken from Pennekamp Park waters but they must be of legal size. Special gauges are used to measure the distance between the horns to the edge of the carapace (it must be at least three inches long).

The mid-Keys around the Marathon area offer a great diversity of diving, shelling, lobstering and photography for the diver with his own boat. Looe Key, a marine sanctuary, is like an underwater fairyland and also readily accessible by boat. Sombrero Reef is also a great dive site and the huge light tower guarding the shoals is readily visible from shore. In these waters it is great sport to drift the "flats" and to dive for queen conch and helmet shells.

I have found that to pursue my favorite sport of scuba diving from the comfort of my own boat allows me a freedom undreamed of by most divers. And, shelling, wreck diving, lobster hunting, underwater photography, swimming, snorkeling, boating and reefcombing combine to provide me with an intensely pleasurable experience, all in the company of family and friends in a domestic locale with a tropical flavor.

SEA & SEA


Flip and Debra Schulke have joined Sea & Sea USA as consultants.

The Schulkes will be conducting underwater photo classes both at their school in Key Largo, Florida and at vari-




ous points in a nationwide tour program arranged by Sea & Sea through their dealer network.

Flip will also work on the development and refinement of the full line of underwater camera equipment produced in Japan and marketed in the United States, Bahamas, and Caribbean by Sea & Sea USA.

For further information contact: Sea & Sea USA, 1334 S.E. 17th Street, Ft. Lauderdale, FL 33316, phone (305) 523-0433. 

DACOR FIN


The August SDM featured a product report on Dacor's Turboflex fin. The name of the material used in the fin's footpocket was incorrect. It and the blade are made of thermoplastic. No rubber is used on the fin except for the strap. 

PADI BUSINESS SEMINAR


For the sixth consecutive year, PADI is offering its Dive Business Seminar Series. In this intensive one-day seminar, dive store advertising and store display/merchandising are explored in depth.

The lecture/workshop program will be presented by Al Hornsby, PADI vice-president, education and public affairs; and C.K. Stewart, co-owner of Atlantis II, a Five Star Training Facility in New York.

The one-day seminar will be offered in a number of cities, including: Santa Ana, CA—November 5, 1982; Las Vegas, NV—January 19, 1983; Toronto, Canada—March 27, 1983; Chicago, IL—May 8, 1983; Houston, TX—July 24, 1983.

For further information, contact: Business Seminars, PADI Headquarters, 1243 E. Warner, Santa Ana, CA 92705; (714) 540-7234. 

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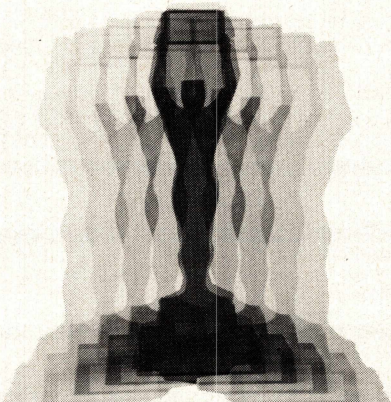
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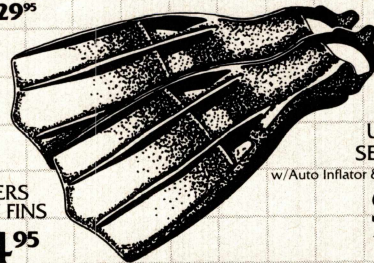
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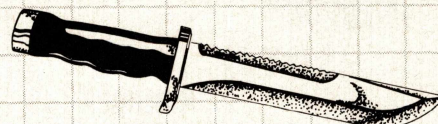
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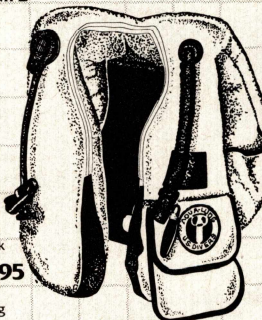
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